

Volume 2

Issue 4

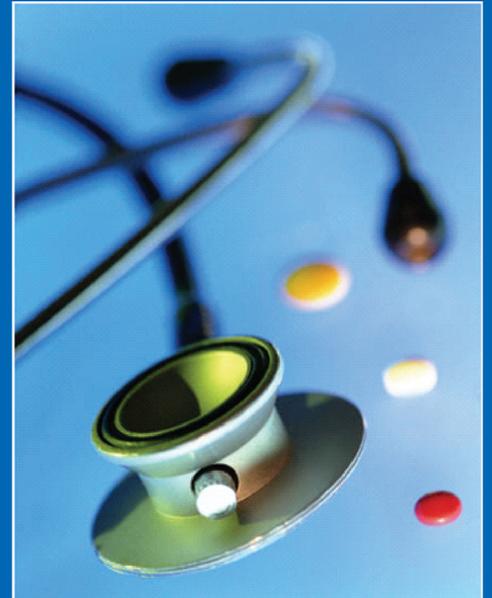
October - December 2009

ISSN 2070 - 4240 (Print), ISSN 2070-4259 (Online)

# J-GMNC-N



कर्मण्येवाधिकारस्ते  
My right is to my work



## Journal of Gandaki Medical College - Nepal

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## TABLE OF CONTENTS

### EDITORIAL

Disaster waiting to happen:

*Timilsina D.S,*

### LEAD ARTICLE

Policy, strategy and plan of action to improve the mental health service in Nepal

1

*Upadhyaya KD*

### REVIEW ARTICLE

Role of spironolactone in left ventricular systolic dysfunction

5

*Paudel B*

### ORIGINAL ARTICLES

Prevalance of diabetes in first degree relatives & ex-armies in western region of Nepal

10

*Upadhyaya TL, Dhakal RR, Paudel B, Shrestha UK*

Functional outcome of treatment of Pediatric femoral shaft fractures by primary hip spica cast at Narayani sub regional hospital, Birgunj

13

*Tripathi RB, Ali R. Bachhar B.*

Fetomaternal outcome in relation to maternal height among primigravidas.

18

*Tripathi M, Chaudhary P*

Hemodialysis at Charak Hospital and Research Center – The first year's experience

24

*Paudel K, Gurung NS*

Analysis of laparoscopic cholecystectomy conversions in Gandaki Medical College, Charak Hospital, Pokhara, Nepal

28

*Dhakal RR, Timilsina DS, Bhuju S, KC M, KC H*

Pre-hospital transport to emergency room in Pokhara, patients perspectives

32

*Gurung NS, Paudel K*

A cross sectional study of assessment of relevance and effectiveness of CHW development system

35

*Talukder Md. HK, Nazneen R, Hossain Md.J, Chowdhury IJ*

### CASE REPORTS:

Phantom pain at the site of extracted teeth.

41

*Baral P, Banstola D, Nepal D*

Hypertension hypokalemia syndrome

43

*KC HB, Chalise P, Sharma U, Gyawali P, Shrestha GK, Joshi BR*

### CME

The Young Patient with Claudication

47

*Timilsina DS*

### Instructions to authors

50



# Editorial

**Timilsina D S**  
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## Disaster waiting to happen

Ethical training in graduate classes of medicine gets very low priority and generates minimal interest. To top it most of the ethical issues are related to intimate dynamics of doctor patient relationship. Examples of ethically conflict prone situations will be

- Informed consent.
- End of life care.
- Certain morally difficult procedures (Abortion after failure of contraception and terminal sedation in dying patient).

In these areas I must say that the educators of medicine are waking up. I see a disaster waiting to happen in another field of ethics. It maybe taboo to talk about and its lurking in the shadows but will manifest soon due to inherent property of social awakening. This is in the expansive field of social justice and health care policy and delivery.

It has been shown statistically that

- Ambulatory vs inpatient treatment centers.
- Ownership of
  - o Testing equipments.
  - o Imaging equipment.

Correlates quite strongly with variation in such as low back pain and breast cancer.<sup>1,2</sup> Favorable testimony too can be acquired in the medico-legal area.<sup>3</sup> Such situations are generating a gray shade in our white coat images. This is rapidly gaining public knowledge and that is how it should be. Generally kickbacks and questionable conflicts of interest can be grouped under

- o Commissions in buying of equipments.
- o Drug representative sponsored educational conference and other benefits.
- o Travelling scholarships.

I will still put such situations as minimal harm situation. Grave harm situations will be the result of stock options in lieu of research results. We are all walking on a very sharp edge. The special status that we enjoy in the society is solely due to our unquestionable reputation as medicine being a very ethical society. We are on the verge of breaking this trust and risk to loose a very unique social standing. This is all because we are putting our personal welfare above the welfare of the patient.

We can learn from the oath taken by the defense forces " The honor, safety and welfare of my nation comes first always and every time, the honor, safety and welfare of the men I command comes second always and every time and my own honor, safety and welfare comes last always and every time."

We have to learn and train in ethics. This is my view.

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Lead Article:

# Policy, strategy and plan of action to improve the mental health service in Nepal

**Upadhyaya KD**

*Senior Consultant Psychiatrist*

To improve the mental health service in Nepal, a National Mental Health Policy, Strategy and Plan of Action was approved by the Nepal Government in 1997. Before presenting to the Government for approval, this policy was discussed by a meeting of psychiatrists including expatriate psychiatrists, psychologists, representatives of National Planning Commission (NPC), Director General of health and personnel from the ministry of health.

This policy has four major goals:

1. Ensure the availability and accessibility of the minimal mental health services for the entire population of Nepal by the year 2000.
2. Prepare the human resources to provide the mental health service.
3. Protect the fundamental human rights of the mentally ill in Nepal.
4. Improve awareness about mental health, mental disorders, and promote healthy life styles.

In 1975, more than 35 years ago World Health Organization stated "detection and management of priority mental disorders should form part of the regular tasks of primary health workers". After 20 year of this important statement, National Mental Health Policy was formulated with above mentioned goals. This policy was formulated with several rounds of discussions with the experts. So this policy, after so many years, is still

good and valid though some changes are necessary in it.

The first goal of this policy of providing minimal mental health service for the entire population of Nepal is still not implemented. Policy makers and planners though they agree in principles, but show their helplessness giving various reasons like unstable political situation, poor infrastructure, lack of human resources, financial limitations, other important health issues than mental health, donors not interested in this field compared to other health sectors and so on.

But even without the much initiative of the government, major changes in health sector has occurred including in the field of mental health. Some NGOs started working in community mental health, counseling services, rehabilitation services for severe mentally ill patients, drug and alcohol treatment and rehabilitation center, school mental health, child mental health, services for conflict affected victims, mental health service for refugees, day care center for mentally ill, skill training for mentally retarded children and so on.

Similarly, many private medical colleges started in Nepal with the development of medical college hospitals, department of psychiatry with hospital beds, many private hospitals with psychiatric outpatient department and some such hospitals with inpatient facility. Development of these facilities improved the treatment facilities for a large number of mental patients.

Goal two of the policy or preparation of human resources was taken by the government more seriously, as a result Tribhuvan

University, Institute of Medicine (TU IOM), Maharajganj and B.P. Koirala Institute of Health Sciences, Dharan started three years residency course in MD Psychiatry both for open and inservice government candidates. Master degree clinical psychology course and psychiatric nursing course was also started in TU IOM. This was a great initiative to develop human resources in the field of mental health from the government.

Mental disorders are found in all countries, in women and men at all stages of life, among rich and poor, and in both rural and urban settings. Mental and behavioural disorders affect more than 25% of people at some time during their lives. Around 20% of all patients seen by primary health care professionals have one or more mental disorder. People can access mental health services closer to their homes, thus keeping their families together and maintaining their daily activities. Mental health services delivered in primary care minimize stigma and discrimination, and remove the risk of human rights violation. But common misunderstandings about the nature of mental disorders and their treatment have contributed to the neglect of mental health service. Despite the potential to successfully treat mental disorders, only a small minority of those in need receive such treatment. The common misunderstandings are:

- Mental disorders affect a small group of population
- Mental disorders cannot be treated
- People with mental disorders are violent or unstable and therefore should be locked.

The notion that mental disorders are problems of industrialized and relatively richer parts of the world is simply wrong. The belief that rural communities, relatively unaffected by the fast pace of modern life, have no mental disorders is also incorrect ( World Health Report 2001)

Surveys carried out in the seven study countries namely Brazil, Canada, Germany, Mexico, Netherlands, Turkey and USA ( for more information [www.hcp.med.harvard.edu/icpe](http://www.hcp.med.harvard.edu/icpe)) showed that Mental disorders are among the most burdensome of all classes of diseases because of their high prevalence and chronicity, early age of onset, and resulting serious impairment<sup>1</sup>. The core disorders included in the surveys were anxiety disorders (panic disorder, agoraphobia, social phobia, simple phobia, generalized anxiety disorder), mood disorders (major depression, dysthymia and mania), and substance – use disorder (alcohol and drug abuse and dependence)

Wells et. al, have shown that the effects of major depression, one of the most common mental disorders, on a wide range of quality-of-life outcomes are comparable to, and in some cases greater than the effects of such chronic physical disorders as hypertension, diabetes, and arthritis, to name but a few<sup>2</sup>.

Because of their early age of onset, mental disorders have powerful adverse effects on critical life –course transitions such as educational attainment<sup>3</sup>, teenage childbearing<sup>4</sup>, marital instability and violence.<sup>5</sup>

Mental and behavioural disorders are estimated to account for 12 % of the global burden of disease, yet the mental health budgets of the majority of the countries constitute less than 1% of their total health expenditures (World Health Report 2001).

Schizophrenia is a disorder associated with high levels of social burden and cost, as well as an incalculable amount of individual pain and suffering. However, there is evidence that the outcome of care can be as successful as it is in many other diseases treated by medical or surgical procedures.<sup>6</sup>

Mental disorders represent four of the 10 leading causes of disability worldwide.

Leading causes of disability-adjusted life years (DALYs) both sexes, 15-44 years-olds (World Health Report 2001)

1. HIV/AIDS
2. **Unipolar depressive disorders**
3. Road traffic accidents
4. Tuberculosis
5. **Alcohol use disorders**
6. Self inflicted injuries
7. Iron-deficiency anaemia
8. **Schizophrenia**
9. **Bipolar affective disorder**
10. Violence

**Treatment gap in epilepsy:** Epilepsy affects about 50 million people worldwide, of whom 80% live in developing countries (WHO 2000). The difference between the number of people with active epilepsy and the number who are appropriately treated in a given population at a given point in time is known as treatment gap. Meinardi and others (2001) estimate that 90% of people with epilepsy in developing countries are inadequately treated<sup>7</sup>. Possible reason for high treatment gap include fear of stigmatization, cultural beliefs, lack of knowledge about the medical nature of epilepsy, illiteracy, economic issues, distance to health facilities, inadequate supply of antiepileptic drugs, and lack of prioritization by health authorities.<sup>8</sup>

Epilepsy imposes a large economic burden on health care system of countries. There is also a hidden burden associated with stigma and discrimination against the patient and even his/her family in the community, workplace, school and home. Many patients with epilepsy suffer severe emotional distress,

behavioural disorders and extreme social isolation.<sup>9</sup>

**The World Health Report 2001 (WHO) in its overview recommends these ten action plan as follows:**

1. Provide Treatment in Primary Care: The management and treatment of mental disorders in primary care is a fundamental step which enables the largest number of people to get easier and faster access to services.
2. Make Psychotropic Drugs Available: Essential psychotropic drugs should be provided and made constantly available at all levels of health care. These medicines should be included in every country's essential drugs list, and the best drugs to treat conditions should be made available whenever possible.
3. Give Care in the Community: Community care has a better effect than institutional treatment on the outcome and quality of life of individuals with chronic mental disorders.
4. Educate the Public: Public education and awareness campaigns on mental health should be launched in all countries.
5. Involve Communities, Families and Consumers: Communities, families and consumers should be included in the development and decision-making of policies, programmes and services.
6. Establish National programmes, Policies, and Legislation.
7. Develop Human Resources
8. Link with other Sectors: Sectors other than health, such as education, labour, welfare, and law, and nongovernmental organizations should be involved in improving mental health of communities.
9. Monitor Community Mental Health: The mental health of communities should be monitored by including mental health indicators in health information and reporting system.
10. Support more research.

**Cost-effective intervention package in Mental Disorders and Epilepsies:**

In developing countries, much of the mental health care and spending is reported to be out of pocket. Individuals purchase modern and traditional treatment if they can afford to do so. Although a large private health sector exists in low income countries, the quality and cost vary. Although unregulated market fail in health, they fail even more in mental health. It is unlikely that a country will be able to rely on an unregulated private sector to deliver services that will reduce the burden of mental disorders.

In the WHO EML the following have been selected for the treatment and control of mental disorders:

PSYCHOTIC DISORDERS	CHLOROPROMAZINE
	Injection 25mg (hydrochloride)/ml Oral liquid 25mg (hydrochloride) /5ml Tablet 100 mg (hydrochloride)
	FLUPHENAZINE (decanoate or enantate) Injection 25mg/ml
DEPRESSIVE DISORDER	HALOPERIDOL Injection 5mg/ml Tablet 2mg; 5mg
	AMITRYPTILINE Tablet 25 mg (hydrochloride)
BIPOLAR DISORDERS	FLUOXETINE Capsule 20 mg (hydrochloride)
	CARBAMAZEPINE Tablet 100 mg; 200mg. LITHIUM CARBONATE Tablet 300 mg
GENERALIZED ANXIETY AND SLEEP DISORDERS	VALPROIC ACID Tablet 200mg; 500mg
	DIAZEPAM Tablet 2mg; 5mg
OBSESSIVE-COMPULSIVE DISORDERS AND PANIC ATTACKS	CLOMIPRAMINE Tablet 10mg; 25mg (hydrochloride)
MEDICINES USED IN SUBSTANCE DEPENDENCE PROGRAMMES	METHADONE Concentrate for oral liquid 5mg/ml; 10mg/ml Oral liquid 5mg/5ml; 10mg/5ml  BUPRENORPHINE Sublingual tablets 2mg; 8mg

**Selection of Antiepileptic drugs (AEDs):**

The pharmacological treatment of epilepsy has been extensively studied primarily in high income countries. Many controlled clinical trials have tested the efficacy of older AEDs such as phenobarbitone and phenytoin and newer AEDs such as carbamazepine and valproic acid, in controlling seizure frequency and their safety when prescribed in monotherapy or in combination. However, there is a lack of definitive evidence on the differences between the older and newer medications. Phenobarbitone is a cost-effective drug in the management of epilepsy. Its benefit far exceed its side-effects, and relative to the newer anticonvulsants. It remains the drug of choice for

the large- scale, community-based programmes particularly in rural and remote areas. The Global Campaign Against Epilepsy, jointly sponsored by WHO, the International League Against Epilepsy and the International Bureau for Epilepsy advocates the use of phenobarbital for closing the currently high treatment gap in low income countries.<sup>9</sup>

## CONCLUSION AND RECOMMENDATIONS

Integration of mental health service including the management of epilepsy at the primary health care will reduce the treatment gap in mental disorders and epilepsies. Free drug supply at primary health care level for the treatment of depressive disorders (amitryptiline and fluoxetine), psychotic disorders (chlorpromazine and haloperidol), and epilepsies (phenobarbitone) is necessary to treat these common disorders. All the essential medicines for mental disorders, as recommended by WHO, has to be there in the essential list of drugs.

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## Editorial Comments:

*I must credit a senior Psychiatrist of this nation for a very thought provoking article. Its all about provision of complete health to our populations. It's the delivery of care that gets lost in the process. Its always easier said than done. The policies strategies and plan of action as illustrated here should be a model for all fields of healthcare. It's my considered opinion that with seniority our thoughts must be focused on policies and plans of action that are practical, achievable and relevant. Dr. KD Upadhyaya has shown us the magnitude of simplicity.*



Review Article:

# Role of spironolactone in left ventricular systolic dysfunction

**Paudel B<sup>1</sup>**

<sup>1</sup>Department of Medicine, Gandaki Medical College

## INTRODUCTION

Spironolactone is a synthetic 17-lactone drug that is a renal competitive aldosterone antagonist in a class of pharmaceuticals called potassium-sparing diuretics. Spironolactone is only a weak diuretic because its effects target the distal nephron (collecting tubule), where urine volume can only be slightly modified; but it can be combined with other diuretics to increase efficacy. About one person in one hundred with hypertension has elevated levels of aldosterone; in these persons, the antihypertensive effect of spironolactone may exceed that of complex combined regimens of other anti-hypertensive.

Spironolactone was primarily used to treat ascites in patients with liver disease, low-renin hypertension, hypokalemia, secondary hyperaldosteronism, and Conn's syndrome (primary hyperaldosteronism). Now it has taken on new life as treatment for left ventricular dysfunction (LVF)

Many physicians had assumed that inhibition of the renin-angiotensin-aldosterone system by an angiotensin-converting-enzyme (ACE) inhibitor would suppress the formation of aldosterone. In addition, treatment with an aldosterone-receptor blocker in conjunction with an ACE inhibitor has been considered relatively contraindicated because of the potential for serious hyperkalemia. Consequently, aldosterone-receptor blockers are used infrequently in patients with heart failure. There is increasing evidence to suggest, however,

that ACE inhibitors only transiently suppress the production of aldosterone. Furthermore, treatment with the aldosterone-receptor blocker spironolactone at a daily dose of 12.5 to 25 mg in conjunction with standard doses of an ACE inhibitor, a loop diuretic, and in most cases digoxin is pharmacologically effective and well tolerated, decreases atrial natriuretic peptide concentrations, and does not lead to serious hyperkalemia. Spironolactone has been shown to decrease mortality in such patients who are New York Heart Association [NYHA] class IV.

On the basis of this information, the Randomized Aldactone Evaluation Study (RALES)<sup>3</sup> was designed to test the hypothesis that daily treatment with 25 mg of spironolactone would significantly reduce the risk of death from all causes among patients who had severe heart failure as a result of systolic left ventricular dysfunction and who were receiving standard therapy, including an ACE inhibitor and loop diuretics, if tolerated.

## EVIDENCE OF BENEFIT IN HEART FAILURE

Based on earlier work suggesting a benefit of therapy, the RALES was undertaken to evaluate the role of spironolactone when used in addition to standard therapy for CHF. Standard therapy in this study did not include beta-blockers. The investigators prospectively enrolled 1,663 patients with severe (NYHA class IV) congestive heart failure (Table 1). Most of the enrolled patients were white men averaging 65 years of age. These patients had a left ventricular ejection fraction of 35 percent or less and marked physical limitations related to CHF. Patients were excluded if they had unstable angina or moderate renal failure, and if they were hyperkalemic.

---

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**TABLE 1. NYHA Functional Classification of Congestive Heart Failure (CHF)**

<i>Class</i>	<i>Description</i>
I	Patients with cardiac disease but without resulting limitations of physical activity. Ordinary physical activity does not cause undue fatigue or dyspnea.
II	Patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue or dyspnea.
III	Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary physical activity causes fatigue or dyspnea.
IV	Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of cardiac insufficiency or of the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased.

All patients who could tolerate the drug were given an ACE inhibitor and a loop diuretic, and 70 percent were taking digoxin. Only 10 percent were taking beta-blockers. Patients were randomly assigned to receive placebo or 25 mg of spironolactone daily in addition to their current regimen. After eight weeks, if the patient showed worsening CHF and had a stable potassium level, the dosage was increased to 50 mg daily. The dosage was decreased to 25 mg every other day if at any time the patient became hyperkalemic.

The reductions in the risk of death and hospitalization were observed after 2 to 3 months of treatment and persisted throughout the study. Results showed 30% reduction in mortality over 2 years. During the study period, one death was avoided for every nine patients receiving spironolactone (number needed to treat [NNT] = 9). Number of hospitalizations due to worsening CHF was decreased by 35%. NYHA classification improved more in the spironolactone group than the control group. The results were consistent among subgroups.

Aldosterone was originally thought to be important in the pathophysiology of heart failure only because of its ability to increase sodium retention and potassium loss. However, in the past several years, research has shown that aldosterone also causes myocardial and vascular fibrosis<sup>6,7</sup>, direct vascular damage<sup>8</sup> and baroreceptor dysfunction<sup>9</sup> and prevents the uptake of norepinephrine by myocardium.<sup>1,10</sup> The reduction in the risk of death in RALES study does not appear to be due entirely to an effect of spironolactone on sodium retention or potassium loss; instead, it is likely that spironolactone is also cardioprotective. In another dose-finding study by RALES investigators<sup>11</sup> stated that a dose of 25 mg of spironolactone

daily had no apparent diuretic effect that is, there was no change in total body weight, the sodium-retention score, or urinary sodium excretion which also agrees the extra benefits of spironolactone in heart failure.

The 35 percent reduction in the risk of hospitalization for worsening heart failure may be attributable to the ability of spironolactone to reduce myocardial and vascular fibrosis. Although the exact cause of the reduction in the risk of death in RALES study remains speculative, investigators postulate that an aldosterone-receptor blocker can prevent progressive heart failure by averting sodium retention and myocardial fibrosis and prevent sudden death from cardiac causes by averting potassium loss and by increasing the myocardial uptake of norepinephrine. Spironolactone may prevent myocardial fibrosis by blocking the effects of aldosterone on the formation of collagen<sup>12</sup> which in turn could play a part in reducing the risk of sudden death from cardiac causes, since myocardial fibrosis could predispose patients to variations in ventricular-conduction times and, hence, to reentry ventricular arrhythmias.<sup>13-5</sup> An aldosterone-receptor blocker reduced the risk of both morbidity and death among patients who were receiving an ACE inhibitor emphasizes the point that standard doses of an ACE inhibitor do not effectively suppress the production of aldosterone.<sup>16,17</sup> Although higher doses of ACE inhibitors may be more effective than lower doses in reducing the risk of morbidity and death among patients with heart failure<sup>18</sup> there is no evidence that higher doses suppress aldosterone production more effectively in the long term. ACE inhibitors cannot totally suppress the production of aldosterone, because other factors in addition to angiotensin II (e.g., serum potassium) are important in the production of aldosterone and may override the effects of angiotensin II<sup>19,20,21</sup> Since aldosterone remains in the circulation, only the presence of an aldosterone-receptor blocker will completely suppress the effects of this hormone.

Discontinuation of treatment occurred in 200 patients in the placebo group and in 214 in the spironolactone group (for lack of response, adverse effects or administrative reasons). Serious hyperkalemia requiring the discontinuation of treatment was uncommon, occurring in one patient in the placebo group and three in the spironolactone group. The primary adverse effect causing discontinuation in 10% of men was gynaecomastia/breast discomfort. Analysis was terminated on August 24, 1998 (16 months early) after interim analysis demonstrated efficacy of the study drug exceeding preset limits.

The patients in RALES study were at higher risk than those in studies of the effects of bisoprolol,<sup>22</sup> digoxin<sup>23</sup>, amlodipine<sup>24</sup>, or carvedilol<sup>25</sup> on heart failure resulting from systolic left ventricular dysfunction and treated with standard therapy, including an ACE inhibitor, but they were at lower risk than patients in a study of the effects of enalapril.<sup>26</sup> The reduction in the risk of death with spironolactone treatment was due to significant decreases in the risk of both death from progressive heart failure and sudden death from cardiac causes. These results are consistent with the current understanding of the

effect of aldosterone in patients with heart failure<sup>24</sup>

### **PATHOPHYSIOLOGY**

The common pathophysiologic state that perpetuates the progression of heart failure is extremely complex, regardless of the precipitating event. Compensatory mechanisms exist on every level of organization, from subcellular all the way through organ-to-organ interactions. Only when this network of adaptations becomes overwhelmed does heart failure ensue.  
28-9,30-2

Most important among the adaptations are the Frank-Starling mechanism, in which an increased preload helps to sustain cardiac performance; alterations in myocyte regeneration and death; myocardial hypertrophy with or without cardiac chamber dilatation, in which the mass of contractile tissue is augmented; and activation of neurohumoral systems.<sup>33</sup> The release of norepinephrine by adrenergic cardiac nerves augments myocardial contractility and includes activation of the renin-angiotensin-aldosterone system [RAAS], the sympathetic nervous system [SNS], and other neurohumoral adjustments that act to maintain arterial pressure and perfusion of vital organs by increasing the peripheral vascular resistance and increase in LV wall stress.

In acute heart failure, the finite adaptive mechanisms that may be adequate to maintain the overall contractile performance of the heart at relatively normal levels become maladaptive when trying to sustain adequate cardiac performance.<sup>34</sup> The primary myocardial response to chronic increased wall stress is myocyte hypertrophy, death/apoptosis, and regeneration.<sup>35</sup> This process eventually leads to remodeling, usually the eccentric type. Eccentric remodeling further worsens the loading conditions on the remaining myocytes and perpetuates the deleterious cycle. The idea of lowering wall stress to slow the process of remodeling has long been exploited in treating heart failure patients.<sup>36</sup> The reduction of cardiac output following myocardial injury sets into motion a cascade of hemodynamic and neurohormonal derangements that provoke activation of neuroendocrine systems, most notably the above-mentioned adrenergic systems and RAAS.<sup>37</sup>

The release of epinephrine and norepinephrine, along with the vasoactive substances endothelin-1 (ET-1) and vasopressin, causes vasoconstriction, which increases afterload and, via an increase in cyclic adenosine monophosphate (cAMP), causes an increase in cytosolic calcium entry. The increased calcium entry into the myocytes augments myocardial contractility and impairs myocardial relaxation (lusitropy).

The calcium overload may induce arrhythmias and lead to sudden death. The increase in afterload and myocardial contractility (known as inotropy) and the impairment in myocardial lusitropy lead to an increase in myocardial energy expenditure and a further decrease in cardiac output. The increase in myocardial energy expenditure leads to myocardial cell death/apoptosis, which results in heart failure and further reduction in cardiac output, perpetuating a cycle of further increased neurohumoral stimulation and further adverse

hemodynamic and myocardial responses.

In addition, the activation of the RAAS leads to salt and water retention, resulting in increased preload and further increases in myocardial energy expenditure. Increases in renin, mediated by decreased stretch of the glomerular afferent arteriole, reduce delivery of chloride to the macula densa and increase beta1-adrenergic activity as a response to decreased cardiac output. This results in an increase in angiotensin II (Ang II) levels and, in turn, aldosterone levels, causing stimulation of the release of aldosterone. Ang II, along with ET-1, is crucial in maintaining effective intravascular homeostasis mediated by vasoconstriction and aldosterone-induced salt and water retention.

The concept of the heart as a self-renewing organ is a relatively recent development.<sup>38</sup> This new paradigm for myocyte biology has created an entire field of research aimed directly at augmenting myocardial regeneration. The rate of myocyte turnover has been shown to increase during times of pathologic stress. In heart failure, this mechanism for replacement becomes overwhelmed by an even faster increase in the rate of myocyte loss. This imbalance of hypertrophy and death over regeneration is the final common pathway at the cellular level for the progression of remodeling and heart failure.

### **ANG II**

Research indicates that local cardiac Ang II production (which decreases lusitropy, increases inotropy, and increases afterload) leads to increased myocardial energy expenditure. Ang II has also been shown in vitro and in vivo to increase the rate of myocyte apoptosis.<sup>39</sup> In this fashion, Ang II has similar actions to norepinephrine in heart failure.

Ang II also mediates myocardial cellular hypertrophy and may promote progressive loss of myocardial function. The neurohumoral factors above lead to myocyte hypertrophy and interstitial fibrosis, resulting in increased myocardial volume and increased myocardial mass, as well as myocyte loss. As a result, the cardiac architecture changes, which, in turn, leads to further increase in myocardial volume and mass.

### **MYOCYTES AND MYOCARDIAL REMODELING**

In the failing heart, increased myocardial volume is characterized by larger myocytes approaching the end of their life cycle.<sup>40</sup> As more myocytes drop out, an increased load is placed on the remaining myocardium, and this unfavorable environment is transmitted to the progenitor cells responsible for replacing lost myocytes. Progenitor cells become progressively less effective as the underlying pathologic process worsens and myocardial failure accelerates. These features, namely the increased myocardial volume and mass, along with a net loss of myocytes, are the hallmark of myocardial remodeling. This remodeling process leads to early adaptive mechanisms, such as augmentation of stroke volume (Frank-Starling mechanism) and decreased wall stress (Laplace's law), and, later, to maladaptive mechanisms such as increased myocardial oxygen demand, myocardial ischemia, impaired contractility, and arrhythmogenesis.

As heart failure advances, there is a relative decline in the counterregulatory effects of endogenous vasodilators, including nitric oxide (NO), prostaglandins (PGs), bradykinin (BK), atrial natriuretic peptide (ANP), and B-type natriuretic peptide (BNP). This occurs simultaneously with the increase in vasoconstrictor substances from the RAAS and the adrenergic system. This fosters further increases in vasoconstriction and thus preload and afterload, leading to cellular proliferation, adverse myocardial remodeling, and antinatriuresis, with total body fluid excess and worsening heart failure (HF) symptoms. Table 2 summarizes the compensatory mechanism during heart failure.

**Table 2. Compensatory Mechanisms During Heart Failure**

Cardiac	<ul style="list-style-type: none"> <li>• Frank-Starling mechanism</li> <li>• Ventricular dilation or hypertrophy</li> <li>• Tachycardia</li> </ul>
Autonomic Nerves	<ul style="list-style-type: none"> <li>• Increased sympathetic adrenergic activity</li> <li>• Reduced vagal activity to heart</li> </ul>
Hormones	<ul style="list-style-type: none"> <li>• Renin-angiotensin-aldosterone system</li> <li>• Vasopressin (antidiuretic hormone)</li> <li>• Circulating catecholamines</li> <li>• Natriuretic peptides</li> </ul>

## CONCLUSION

- Studies have shown that treatment with spironolactone reduced the risk of death from all causes, death from cardiac causes, hospitalization for cardiac causes among patients who had severe heart failure and who were receiving standard therapy including an ACE inhibitor and loop diuretics.
- The particular advantages of spironolactone for prevention are that it is inexpensive, is taken once daily and has relatively few side effects.
- Further research is needed to understand its usefulness in patients with less severe HF and whether its benefit is present in patients who are also taking beta blockers.

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### Editorial Comments:

*Distinctly this article is worth a read. Some clear insights are well put up. The RALES study has been mentioned here. This article specially advocates ACEI, Loop diuretic and Spironolactone in combination to reduce deterioration and mortality in moderate to severe heart failure.*

*A low-dose aldosterone antagonist should be considered in all patients with an LVEF ≤ 35% and severe symptoms (NYHA class III or IV), unless contra-indicated or not tolerated and in the absence of hyperkalaemia and significant renal dysfunction.*

*The problem of hyperkalemia should have been given some weightage – this will occur more frequently in clinical practice than under trial conditions has been very amply illustrated by Pitt B et al (The effect of spironolactone on morbidity and mortality in patients with severe heart failure. Randomized Aldactone Evaluation Study Investigators.; *N Engl J Med*. 1999 Sep 2;341(10):709-17) Where breast tenderness or enlargement occurs we may need switch from spironolactone to eplerenone.*

*The take home message still should be that the initial pharmaco therapy for LVF should be ACEI, Diuretics and Betablockers. The addition of Digoxin and Spironolactone/ eplerone must be after specialist referral.*

*I congratulate Dr Badri Paudel for this concise article.*



Original Article

# Prevalance of diabetes in first degree relatives & ex-armies in western region of Nepal

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## Keywords:

Diabetes  
Genetic factor  
Environmental factor

## ABSTRACT

**Objective:** To study the prevalence of diabetes in first degree relatives and ex armies in western region of Nepal and to see whether environmental factor plays a role in the development of diabetes.

**Methods:** This study is a hospital based descriptive cross sectional study diagnosed as diabetes using WHO 1999 diagnostic criteria for diabetes in Charak and Manipal hospitals of Pokhara, a tertiary care centers in western Nepal. The study was done from September, 2009 to June, 2011. Patients were individually questioned about the status of diabetes in parents, siblings and offsprings. Patients were also asked about the past involvement in security services. The data were collected from the questionnaire and stastically analysed using SPSS 11.5.

**Results:** About 17.33% of the patients had diabetes in their first degree relatives which is bit higher than data from western countries. People retired from security services and their spouses had high prevalence of diabetes which was not the case before joining the service. About 62% of those population had diabetes after retirement. This suggests that the environmental factor that is sedentary life style plays a major role in the pathophysiology of diabetes.

**Conclusion:** The Environmental factor rather than genetic factor is a major culprit in the prevalence of diabetes.

## INTRODUCTION

Diabetes mellitus is a condition of chronically elevated blood glucose concentrations which give rise to the passing of the large amount of sweet urine. The fundamental underlying

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abnormality is a net (relative or absent) deficiency of the hormone insulin. Insulin is essentially the only hormone capable of lowering blood glucose. Diabetes is classified as type 1, type 2, other type of diabetes and gestastional diabetes. The environmental factor triggers the onset of diabetes in patients with genetic predisposition. So pathophysiology behind diabetes is environmental and genetic factor in which environmental factor is playing a greater role now.

In this research we want to see what is the likely hood of

diabetes in first degree relatives in western region of Nepal and also to find out whether if environmental factor is a major culprit in place like western Nepal where huge majority of diabetes patient has military background.

### RESEARCH DESIGN AND METHODS:

This study is a hospital based descriptive cross sectional study diagnosed as diabetes using WHO 1999 diagnostic criteria for diabetes in Charak hospital and Manipal hospital of Pokhara, a tertiary care centers in western Nepal. The study was done from September, 2009 to June, 2011. Patients were individually questioned about the status of diabetes in parents, siblings and offsprings. Patients were also asked about the past involvement in security services.

### ANALYTICAL METHODS:

- (1) For Blood glucose and lipid profile 7170 all automatic bio analyzer was used, one touch ultra glucometer was used to test capillary glucose .
- (2) BIO RAD D-10 all automatic HbA1c analyzer was used to measure HbA1c.

### STATISTICAL METHODS:

Use t-test to compare between groups  $P < 0.05$  denotes the statistically significance Data processing and analysis were done with SPSS 11.5 software.

### RESULTS:

#### 1. Prevalance of diabetes in first degree relatives

Total number	Frequency of Diabetes	% of Diabetes
300	52	17.33%

#### 2. Relationwise distribution.

Relations	Parents	Siblings	Offsprings
Frequency	17	21	14
%	5.6%	7.0%	4.7%

Comparing between groups  $P > 0.05$ , no statistically significance

#### 3. Diabetes in ex military job holders/spouse. Note they were non Diabetic before joining the job.

Background	Frequency	%
Ex Military	187	62.33%
Non Military	113	37.67%

Comparing between groups  $P < 0.05$ , statistically significant.

### DISCUSSION

Diabetes is a disease that everyone is talking about now. The fundamental underlying abnormality is a net (relative or absent) deficiency of the hormone insulin. Insulin is essentially the only

hormone capable of lowering blood glucose<sup>7</sup>. We now know that diabetes is classified as type 1, type 2, other type of diabetes and gestational diabetes<sup>1</sup>. The environmental factor triggers the onset of diabetes in patients with genetic predisposition. So pathophysiology behind diabetes is environmental and genetic factor in which environmental factor is playing a greater role. In type 2 diabetes Insulin resistant exist throughout the course of the disease.  $\beta$ cell dysfunction is a must for the development of type 2 diabetes, and the gradual loss of  $\beta$ cell function is the driving force for the progression of the disease<sup>(2)</sup>.

In our study we want to show how much the genetic and environmental factor are influencing in the causation of the disease in western region of Nepal where a lot of people are retired military personnel with a heavy sedentary lifestyle.

Genetic susceptibility to type 1 diabetes is most closely related with HLA genes that lie within the MHC region on the short arm of chromosome 6 (IDDM locus).<sup>3</sup> Over 20 regions of the human genomes are associated with T1 DM. HLA are cell surface glycoproteins that show extreme polymorphisms in the genes that code for them. Both high and low risk HLA haplotypes have been identified. HLA DR/4, DQA1\*0301-DQB1\*0302 and DQA1\* 0501-DQB1\*0201 account for over 50% of genetic susceptibility, whereas DQA1\* 0102-DQB1\*0602 and DQB1\*1401 are protective. Unlike Type 1 DM, T2DM is not associated with genes in the HLA region<sup>(4)</sup>. So far 19 genes variant have been described validated as being associated with T2DM. Of these the strongest is TCF7L2.<sup>5</sup> Although genetic factors are undoubtedly important, the relatively low concordance of <50% in monozygotic twins together with the rapidly increasing rise in the T1DM at a younger age suggest that external or environmental factors are playing a role. Viruses, diet toxins and early feeding of cows milk, psychological stress are being investigated<sup>6</sup>

In our study 300 diabetic patient from the western region of Nepal were enrolled. Only 17.67% had genetic background. 187 diabetic patients enrolled were found to be ex army or their partners which accounted for about 63% of the cases studied. All of them were free from the disease before joining the job. They were found to have diabetes after their retirement. This study shows that genetic factor plays a role but not a sole or an important factor in causing diabetes. People of military background earn sufficient money. Their life style changes vigorously after retirement. They own a nice home, nice car, they eat diet rich in carbohydrate, fats, they have less physical exercise. As pathophysiology behind T2DM is relative deficiency of insulin or insulin resistant caused mainly due to obesity and sedentary life style<sup>8</sup> these people are very prone to diabetes.

So, the recommendation from this study will be Diabetes is in the pipeline for you. Don't be too happy. Eat a balanced diet, do

regular exercise, get free from the killer of 21<sup>st</sup> century.

## CONCLUSION

The western region of Nepal where a lot of people have military background, huge bulk of those population are suffering from diabetes after their retirement who were free of the disease before joining the jobs. This probably shows that sedentary life style (environmental factor) plays a greater role than genetic factor in the pathophysiology of Diabetes.

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Original Article

# Functional outcome of treatment of pediatric femoral shaft fractures by primary hip spica cast at Narayani sub-regional hospital, Birgunj.

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## Key words:

femoral shaft fractures  
limb length angulation  
rotation  
hip spica cast

## ABSTRACT

**Hypothesis:** Management of femoral shaft fractures in children by primary hip spica cast without initial traction is a safe, simple, reliable and cost-effective method of treatment.

**Methodology:** A prospective non blind clinical observational study from Baisakh 2065 to Ashadh 2066. Age between six months to 10 yrs both inclusive. Follow up period six months to 1.5yrs.

**Result:** 42 patients were included in the study. One lost to follow up and 2 cases failed. Radiological union was complete in all cases in expected time frame. Limb length discrepancy, angular or rotational deformities and major complications were negligible with overall good functional result.

**Conclusion:** Primary hip spica cast method of treatment for pediatric femoral shaft fractures is safe, easily applicable and cost effective provided due care is adopted during application of the cast and strict regular follow up is done in initial phase. It can be easily practiced even at district hospital level by medical officers with short period of training at any orthopedic centre.

## INTRODUCTION

Fractures of shaft of femur in children are common problem faced by all orthopaedic surgeons in their day to day practice. These fractures account for 7.6% of all pediatric long bone fractures.<sup>1</sup> Such fractures usually result from direct violence in most of the cases. Low energy traumas like fall from small heights or sports related injuries in younger children and high

energy trauma like road traffic accidents in older children are the common modes of injury in such fractures.<sup>2</sup> Consensus for the management of these fractures below 5 years of age exists but opinion still differs for children between 5 to 11 years of age groups.<sup>3</sup>

Similarly, consensus regarding management of such fractures in older children above 11 yrs age and adolescents also exists; where open reduction and internal fixation by various means has been globally accepted. In the past, all isolated and uncomplicated fractures of the femoral shaft in children below 10 yrs of age; were treated conservatively by either traction or plaster spica casts. Recent advances in external and internal fixation techniques have changed this attitude.

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But any decision to operate on these fractures in children requires very careful analysis and judicious decision in terms of convenience, cost and complications. Provided that good surgical facilities are available, surgical stabilization may be justifiable not only for the patient and the party but also for the medical subordinates involved in nursing care during the period of fracture healing. Bar-On et al. (1997) suggest that fixation by flexible nails is appropriate for patients over the age of five years<sup>4</sup> but it would have been more appropriate had it been compared prospectively with a conservatively managed control group! Fixation of such fractures by any surgical means certainly requires more than two anesthesia and two operations along with the risk of surgical complications. Management in a hip spica cast primarily or after an initial short period of traction requires a single short general or regional anesthesia. Virtually, any method of treatment will be successful if success is defined by healing of the fracture and resumption of usual activities because children fractures are doomed to heal<sup>5</sup>.

Among the conservatively managed fractures, the increasing pressure on surgeons to shorten the hospital stay and the psychological and economic aspects of extended hospital stay on part of the patient party have shifted the momentum towards primary spica cast management. Femoral nonunion is virtually unknown in children. Mal union has been reported to some extent. Pediatric long bones have got tremendous capacity of remodeling. In a child, minor malunion is of little concern provided large rotational and angular deformities are ruled out. Even substantial degrees of mal unions managed properly by timely cast wedging; usually result in spontaneous correction of angular deformities. Long term reviews of remodeling such as that of Wallace and Hoffman (1992) show that an initial angular deformity of even 25° can recover to give normal function in the end<sup>6</sup>. Over growth is the more likely result after an operation on long bones of smaller children. Excessive shortening of the fractured femur and resultant limb length inequality is the most frequently encountered complication of primary cast treatment if not followed up properly till final union. The importance of limb length discrepancy may have been over rated unless it reaches 2 cm or more in a child. Newton and Mubarak (1994) found that the early application of a hip spica cast was the cheapest option, although effective only in younger children<sup>7</sup>. Similarly, the risk of surgical complications is an important factor; especially any which may lead to a lasting disability. Immediate hip spica cast eliminates the incidence of pin tract infections, wound dehiscence, osteomyelitis, lengthy hospital stays, increased cost, epiphysiodesis of the greater trochanter and last but not the least vascular necrosis of femoral head<sup>8</sup>. Re fracture may occur both in conservative or operative treatment. A review of orthopedic literatures on this feature provides no unequivocal evidence.

Sugi and Cole et al in their series of study found that treatment of fractures of the middle third of femur by primary hip spica cast application was simple and effective. It dramatically reduced the cost of care and reduced the hospital bed occupancy<sup>9</sup>.

## MATERIALS & METHODS

It was a prospective non blind clinical observational study done in the department of Orthopaedics at Narayani Sub regional Hospital, Birganj, Nepal, between the periods of Baisakh 2065 to Ashadh 2066 B.S. Cases between 6 months to 10 yrs of age both including; having fracture of femoral shaft attending this hospital were enrolled in a data sheet. Only those cases were enrolled who had uncomplicated single fracture of shaft femur. The level of fracture site was at or below the junction of upper and middle third of the shaft and above the supracondylar region. They had no other major systemic injuries. Those cases having multiple fractures were excluded. All the fractures of transverse, oblique or spiral geometry were included but those having segmental fracture geometry were excluded from the study. Similarly, older children more than 10 yrs of age and comminuted fractures were also excluded. The cases were followed up for average one year (six months to 1.5 years.). X-rays were done at least in two different views. Fracture geometry, shortening, rotation and angulations were recorded in the data sheet.

After enrollment, cases were shifted to plaster room either immediately or earlier possible when fit for general anesthesia. In all cases, short general anesthesia by intravenous or intramuscular injection of ketamin was given. The patient was shifted to fracture reduction table and both lower limbs were securely fastened with belts. Traction and manual counter traction were applied to the affected limb. Attempt was done to achieve proper correction of shortening, angular and rotational deformities. Special attention was taken to avoid fracture distraction due to excessive linear traction. Bayonet apposition with 0.5 to 1cm shortening was desired. The foot was held in slight lateral rotation. The knee and hip joints were put in 30°- 40° flexion. Double spica cast was applied for smaller children below two 2 years and one and half spica for older children. The cast was molded antero-posteriorly and medio-laterally. The abdominal segment of the cast was extended up to xiphisternum level proximally. Proper strengthening of the cast was done at the joints involved. Abduction bar was incorporated in the cast between two thighs to hold the fractured limb in the abducted position. Traction was released and the rest of the cast was completed. The patient was shifted to the bed for observation for next 24 hours to rule out any early complication of the cast. Check x-rays were done in both antero-posterior and lateral views. Post reduction correction of shortening, angulations and rotation was recorded in the data sheet. The patient was

discharged home with necessary instructions to the parents. Any correction of residual angular and rotational deformities was done before two weeks.

The cases were followed up in out patient department every week for first three weeks, and then fortnightly till the cast was removed usually after 8-12 weeks when radiological union was satisfactory. Timing of healing is difficult to measure accurately. The time until full weight bearing was considered the best measure of healing. Callus formation is one of the useful indicators of fracture healing. Callus formation was graded on a scale of 0-3. Grade 0 indicated no identifiable fracture healing, Grade I indicated primary fracture healing with little or no periosteal new bone formation. Similarly, grade 2 indicated periosteal new bone formation on two sides of the fracture and grade 3 indicated callus formation on three or four sides of the fracture. Final grading of the callus formation was done at the time of full weight bearing. Six monthly follow up was done thereafter for one and half years. Limb length measurement was done at six month, 1 yr and last follows ups. Depending upon the age of the child; maximum up to 2 cm of shortening, 20° anterior angulations and 15 degrees of valgus angulations but no posterior or varus angulations were accepted.

**RESULTS**

Total number of cases enrolled in this duration was 42. There were 23 boys and 19 girls. The boy to girls’ ratio was 1.2:1(Table:1). The age ranged from six months to 10 years with mean age of 7.2 years (Table:2).

The left and right side distribution was almost equal; 22 cases having right sided and 20 cases having left sided fractures (Table:3). According to fracture geometry, 16 cases were transverse, 18 were short or long oblique type and rest 8 cases were spiral type of the fractures (Table:4)

**Table: 1**

<i>Distribution of sex</i>	
Boys	23
Girls	19
<b>Total</b>	<b>42</b>
<b>Boys:girls</b>	<b>1.2:1</b>

**Table: 2**

<i>Distribution of age</i>	
0 - 2 yrs	5
2 - 4 yrs	8
4 - 6 yrs	12
6-8 yrs	10
8-10 yrs	7
<b>7.2 yrs</b>	<b>Mean Age</b>

**Table: 3**

<i>Side distribution</i>	
Right	22
Left	20
<b>Total</b>	<b>42</b>

**Table: 4**

<i>Fracture pattern</i>	
Transverse	16
Oblique	18
Spiral	08
<b>Total</b>	<b>42</b>

Fall from height was the commonest mode of the injury with

24 cases followed by 12 cases of play activities injuries. Next to these were the RTA cases which were 3 in number. The remaining 3 cases had various other modes of injury (Table:5)

**Table: 5**

<i>Mode of Injury</i>	
Fall from height	24
Play activities	12
RTA	03
Others	03
<b>Total</b>	<b>42</b>

**Table: 6**

<i>Site of fracture</i>	
Jn. upper & middle third	23
Middle third shaft	15
Lower third shaft	4
<b>Total</b>	<b>42</b>

The fracture site was near the junctional areas of upper & middle third of the shaft in 23 cases, mid third shaft in 15 cases and distal third in 4 cases (Table:6). 35 children were from school going group and rest 7 children were non school going group at the age of their injury. The mean shortening of the limb length was 2.6cm at the time of admission. Duration of the hospital stay was minimum 1 day for 8 cases, 2 days for 29 cases and 3 days for 5 cases.

Out of 42 cases, 2 cases lost their reduction within four weeks resulting in excessive shortening and angular deformities; mainly because of breakage and loosening of the spica cast. They were ultimately managed by open reduction and internal fixation with DCP. 39 cases were on regular follow up for minimum period of six months to 18 months after discharge from hospital. One case was lost to follow up after removal of the spica cast by 12<sup>th</sup> week but before six months. He had his fracture united without any major complication at his last visit to this clinic but his final result is unknown. 40 cases had their fractures united within 8-12 weeks with grade 3 callus on fracture healing measurement scale. 5 cases had grade 3 callus formations in 8 weeks, 19 cases by 10<sup>th</sup> week and 16 cases by 12<sup>th</sup> week. The mean duration of radiological healing of fracture was 10.55 weeks (Table: 7). Out of 39 cases; 36 cases had no limb length discrepancy at the time of last follow up. Two cases had > 2 cm shortening at 1 yr follow up, while one child had about 1.5 cm shortening. None of the child had any obvious limb lengthening. All except two had attained normal gait at last follow up. No significant angular, rotational or functional deformities were noticed in any case. In all, six cases had breakage of their cast. Among them, four cases who reported in time, needed either change or re enforcement of their casts within four weeks because of wetting and breakage. Of the 4 cases, two landed safely in the end without any significant complication while the other two cases resulted in limb shortening of >2cm as mentioned earlier. Two cases who had some unacceptable degree of excess anterior angulations after primary reduction needed wedging of the cast within two weeks Three cases developed minor degree of pressure sores within the cast, which healed in due course without any long term complication. There was incidence of refracture in any case till last follow up. There

was no significant mal union other than shortening in any case at the time of last follow up (Table: 8). There were no complications in terms of distal neurovascular compromise or avascular necrosis of the femoral head till last follow up. Problems in toileting and maintenance of hygiene were the most common complaints made by the attendants of almost all the patients.

**Table: 7**

<i>Duration of fracture healing</i>	
8 weeks	5
10 weeks	19
12 weeks	16
10.55 weeks	mean
Total	40
Failed reduction	2

**Table: 8**

<i>List of complications</i>	
LLD	3
Cast breakage	6
Loss of reduction	2
Plaster sore	3
Mal union	0
Re-fracture	0
Total	14

## DISCUSSION

Fractures of shaft of femur are common in children. The management of such fractures depends on many factors including age, mode of injury, fracture configuration, associated injuries, economic consideration as well as expected complications. Above all, the goal is to achieve solid bony union without excessive shortening and mal alignment and good functional result.

The debate regarding optimal treatment of femoral shaft fractures in children is still far from resolved. Consensus exists for treatment of such fractures in younger children below 5 years age by primary hip spica cast. Similarly, for older children above 10 yrs and adolescents; the treatment of choice is surgical intervention with various options for fixation with minimal side effects. But the world of Orthopedists is still not unanimous regarding management of such fractures in children between 5-10 yrs age group. Considering the risks of surgical intervention in this age group, trend is towards initial skin traction for few weeks followed by secondary hip spica cast for the remaining period. But lately, the scarcity of hospital beds and the burden of prolonged hospital stay on part of the surgeon, time and cost factors on part of the parents have gathered the momentum towards primary spica cast management after immediate reduction. Many Orthopedic surgeons still prefer to use primary surface traction and secondary hip spica cast in the children of 5-10 yrs age group. But the advantages of short hospital stays, minimum risk of complications, less expenses, early return to family environment and over all good functional result are forcing to reconsider their treatment options<sup>9</sup>. The short period of hospital stays helps the patients to recover from other minor associated injuries and helps the parents to come out from mental agony. It also provides time to the parents to

be instructed about proper care of the cast and the child care in the spica cast.

In patients with multiple traumas and in comminuted fractures of the femoral shaft, other approaches such as external fixations may have greater efficacy (Sarawak 2001)<sup>10</sup> but immediate hip spica cast immobilization is simple, cheap and definitive method of treatment for uncomplicated closed femoral shaft fractures in children. Limb length discrepancy has been the most common problem after femoral shaft fractures. According to Nordin et al (2001) anatomic reduction results in over growth, and shortening >2 cm is unacceptable while shortening <1.5 cm is desirable<sup>11</sup>

Acceptable shortening is related both to age of the child and stage of the treatment. But the maximum allowable shortening should always be less than 10% of the femoral length at all stages of fracture healing. Reasonable overlap will correct spontaneously over the time but would hardly be acceptable to the parents at the time of removal of the spica cast. It is very important to ensure that the parents understand the natural history of recovery and fracture healing. They are often disturbed by the radiological appearance of a transverse fracture with a bayonet apposition and obvious clinical shortening at the time of spica removal. They should be taken in confidence and properly explained about progressive improvement in the child's gait and limb length discrepancy over the expected time period, provided the disabilities are within the limit. Nork et al (1998) have also suggested that overgrowth does occur in younger children and immediate spica casting with early discharge to home is associated with few complications, without functional limitations and minimal limb length inequality<sup>12</sup>. According to Wallace and Hoffman; anterior angulations of >20 degrees and valgus angulations of >15 degrees should be prevented at all stages during fracture healing<sup>6</sup>. Varus angulations and posterior angulations are bound to result in long term deformities, hence; not acceptable at all. Angulations in excess or in opposite directions should be corrected by wedging of the cast in time. Correct rotation is usually achieved by placing the foot in slightly out turned position with an additional 10 degrees of lateral rotation for proximal fractures.

The result of the present study shows overall satisfactory results in about 91% cases. This is in accordance of most of the similar studies done in other hospitals of Nepal. R.P Singh et al in a similar study at Nepal Medical College Kathmandu in 220 cases had satisfactory outcome in more than 90% cases in a follow up period of 2-5 yrs<sup>13</sup>. P Chaudhary in a similar study at Bir Hospital Kathmandu (2004-2006 AD) in 45 patients; had excellent result in almost 100% cases with very few minor complications<sup>14</sup>.

## Comparison of Limb Length Discrepancy (LLD)

Adapted from Infante et al. (2000)

<i>Study</i>	<i>LLD Rate</i>	<i>Treatment method</i>
<b>Irani(1976)</b>	<b>10/75 (13%)</b>	<b>Primary hip spica</b>
<b>Burton(1972)</b>	<b>1/14 (2%)</b>	<b>Early hip spica</b>
<b>Stahili (1967)</b>	<b>20/34 (24%)</b>	<b>Skin traction</b>
<b>Aronson(1987)</b>	<b>11/54 (20%)</b>	<b>Skeletal traction</b>
<b>Celikar(1988)</b>	<b>0/68 (0%)</b>	<b>Early spica with femoral pin</b>
<b>Ours (2009)*</b>	<b>3/42 (7.4%)</b>	<b>Primary hip spica</b>

\* Result of the present study in comparison with others.

## CONCLUSION

The study shows that there are significant advantages of primary hip spica cast without initial traction for the treatment of closed, isolated, uncomplicated fractures of shaft femur in children up to 10 yrs age. Such fractures in this age group mostly unite without major complications with good functional results at expenses of minimum cost. The children return home and the parents go to their job much earlier than expected. It is safe, simple, reliable and very much affordable method of treatment of such fractures in this age group. Due attention at the time of reduction and cast application; and strict regular follow up are the keys of success of this technique. This technique can be easily adopted by the medical officers of the district hospitals of our country after a short period of training at any orthopedic centre practicing this technique. Of course, this conclusion is on the basis of study of a small sample with shorter period of follow up. Study of a larger sample and prolonged follow up would be more appropriate to draw a definite conclusion.

## ACKNOWLEDGEMENTS

We are grateful to our anesthetists Dr. Winner Pradhan, Mr. Vishwanath Chaudhary and Orthopedic paramedic assistants Mr. Hare Ram, Hem Chandra & Munindra for their assistance and help in treating these patients and compiling the data. We are also grateful to our patients and their parents who allowed us to carry out this study and fully co-operated as required.

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Original Article

# Fetomaternal outcome in relation to maternal height among primigravidas.

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## Key words:

Short stature  
antenatal checkup  
height  
PPH  
spontaneous vaginal delivery

## ABSTRACT

**Objective:** To find out the relationship between the height of pregnant women and the fetomaternal outcome. Outcome measures were modes of delivery, incidence of Post Partum Haemorrhage, genital tract injury, neonatal weight and admission to Special Care Baby Unit.

**Methodology:** A hospital based cross-sectional comparative study was conducted at Maternity Hospital, Thapathali, Kathmandu. 400 primigravidas in labour were enrolled; among which 200 cases were from study group (height < 150 cm) and another 200 cases from control group (height ≥ 150 cm). Period of data collection was two months, from 17<sup>th</sup> August, 2008 to 16<sup>th</sup> October, 2008.

**Result:** The incidence of instrumental delivery, risk of caesarean delivery, major genital tract injury and incidence of Low Birth Weight was higher in short stature mothers. Similarly, admissions to SCBU were higher in babies of short stature mother.

**Conclusion:** Pregnancy outcome was found adverse among women of study groups (<150 cm height) as compared to the comparison group (≥150 cm). It was more adverse in study sub group B (<145 cm) than the sub group A (>145cm to 150 cm).

## Glossary of Abbreviations:

SCBU= special care baby unit.                      LBW= low birth weight  
SVD= spontaneous vaginal delivery              LSCS= lower segment caesarean section  
IUGR= intra uterine growth retardation        PPH= Post Partum Hemorrhage

## INTRODUCTION

Short maternal stature, a physical parameter that was highlighted several years ago but has received less attention until recently, is one of the important risk factors that can affect the pregnancy

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outcome. During the past few years, there have been attempts to identify and categorize risk factors that could help to place pregnant women at different level of care in order to achieve optimum obstetric outcome. Moreover, it is a risk indicator that is easy to use, accurate and reliable. According to World Health Organization (WHO), every short stature woman is at high risk for fetopelvic disproportion and they should be referred to a center equipped with facility for operative delivery services at round 0' clock.

A short stature woman is more likely to have a contracted pelvis. Stature of women is found to be related to her pelvic indices and hence, could affect her capacity to deliver safely without causing damage to her genital tract as well as traumatic delivery of baby leading subsequently to birth asphyxia and its consequences.

Short stature is a risk factor for adverse pregnancy outcome and needs obstetric intervention for safe delivery.<sup>1</sup> Thompson presented the evidence that maternal height influences the outcome of pregnancy in all social classes. He concluded that in addition to environmental factors, genetic influences could be involved.<sup>2</sup> A hospital based case control study carried out at El-Shifa & Khan- Younis hospital in 2007 revealed a negative statistical relationship between maternal height and preterm birth.<sup>3</sup>

### OBJECTIVES

- To find out the relationship between maternal height and mode of delivery.
- To determine the incidence of genital tract injury and PPH in short stature women (<150cm)
- To analyse the relationship between height and perinatal outcome. Outcome measure will be the following;
  - Live or still births
  - Birth weight
  - Admission to SCBU
- To identify the Cut-Off Point for safe confinement among short stature Nepalese Women.

### METHODOLOGY

**Type & place of study:** This was a hospital based cross-sectional comparative study. The study was conducted at Paropakar Maternity and Women Hospital, Thapathali, Kathmandu, Nepal, which has 17,640 deliveries annually and a total annual obstetrics admission is 23178 cases.

Period of data collection was 2 months from 17<sup>th</sup> August, 2008 to 16<sup>th</sup> October, 2008.

During this period 200 cases were enrolled as study group (height < 150cm) and 200 cases were taken as control group (height ≥150cm).

**Sampling technique:** Sampling was purposive and non-randomized. Sample populations were all pregnant women in labor admitted in Maternity Hospital during the period of data collection. All primigravidas who fulfilled the inclusion criteria were enrolled for the study. Patients were enrolled from emergency room, antenatal ward and labour room.

**Inclusion criteria:** Primigravidas with cephalic presentation in labour at or above 28 weeks of gestation.

### Exclusion criteria

- Uterine anomalies
- Multiple pregnancies
- Pregnancy with medical disorders like hypertension, diabetes mellitus, asthma, cardiac diseases etc.
- Moderate to severe anemia (Hb% - < 8gm %).
- Any other Obstetric complication like APH/ malpresentation/ obstructed labour etc.

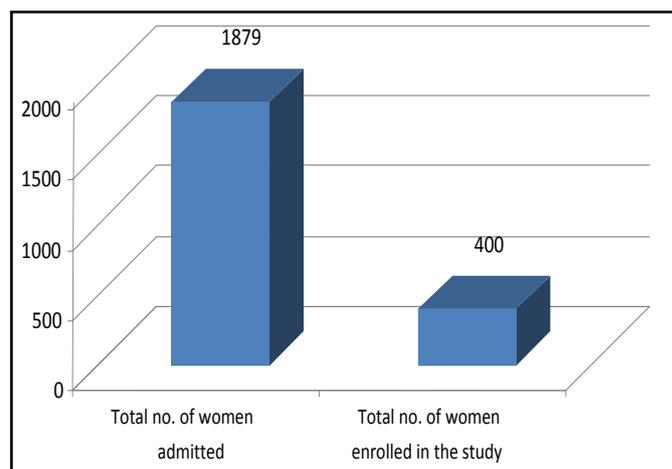
**Study group and comparison group:** Women were enrolled as study group if they met the inclusion criteria and their height was less than 150 cm. For analysis, control group was taken as those women who met the inclusion criteria with height ≥150cm and who did not have any factors mentioned in exclusion criteria. The study group and the control group were selected on alternate basis i.e. for each study group, a control group who delivered the same day or within few days of the case, was taken. The study group was further divided into two subgroups i.e. subgroup A and subgroup B for further analysis and to identify the cut off limit for safer delivery among short stature women. Those whose height ranged from 145cm to 150cm were categorized as subgroup A and those who were less than 145 cm in height were placed in the subgroup B.

**Ethical consideration:** Permission was taken from the Hospital authority before start of the study. Only those women; willing to participate in the study were enrolled.

**Data analysis:** Obtained data were entered in a master chart which was maintained daily. Data were presented in table, charts, and diagrams. Chi-Square test and Z- test was used for statistical analysis. The P-value was considered significant if less than 0.05.

### RESULTS

**Figure-1: Number of women who were admitted and enrolled**



Total no. of primigravida admitted from 17<sup>th</sup> August, 2008 to

16<sup>th</sup> October, 2008, were 1879. Among those, two hundred cases who met the inclusion criteria were enrolled for study group, and two hundred cases for control group (figure 1). The percentage of women enrolled was 21.28%.

**Table -1 Maternal height and mode of delivery.**

Height in centimeter	Mode of delivery						total
	Spontaneous vaginal delivery		Instrumental delivery		Caesarean section		
	No	%	No	%	No	%	
<145cm (study sub-group B)	49	61.3	8	10	23	28.7	80
<150-145cm (Study sub-group A)	101	84.2	4	3.3	15	12.5	120
≥150cm (Comparison group)	176	88	8	4	16	8	200

In this study, there were 150 cases of spontaneous vaginal delivery (SVD) in study group as compared to 176 cases in control group. 38 cases underwent LSCS deliveries as compared to 16 cases in control group, which is statistically significant ( $p=0.001$ ). Regarding instrumental delivery, there were 12 cases in the study group (6%) and 8 cases in the control group (4%). It can be seen that risks of having instrumental delivery (6%) and caesarean section (19%) are higher among the short stature women of study group as compared to those in control group (2% and 4% respectively). On the other hand, among women of study sub group B, there is significantly more risk of instrumental delivery ( $P=0.05$ ) as well as caesarean section ( $P<0.0001$ ) in comparison of sub group A.

**Table -2 Maternal height and genital tract injury**

Height in centimeter	Major genital tract injury								total
	3rd /4th degree perineal tear		Extended episiotomy up to lateral vaginal wall		Cervical tear		Perineal haematoma		
	n	%	n	%	n	%	n	%	
<145cm (study sub-group B)	4	5	8	10	1	1.25	1	1.25	80
<150cm-145cm (study sub-group A)	1	0.83	2	1.66	1	0.83	0	0	120
≥150cm (comparison group)	0	0	4	2	0	0	0	0	200

The incidence of major genital tract injury increased as the

maternal height decreased. In the study group, out of eighteen cases, there were five women who suffered from 3<sup>rd</sup> degree perineal tear (27.7%) compared to none in the control group showing statistically significant relationship ( $P=0.02$ ). (Table-2). There were ten cases of extended episiotomy up to lateral vaginal wall in study group (5%) as compared to only four cases in the comparison group (2%). Similarly, two women had cervical tear (1%) as compared to none in the comparison group.

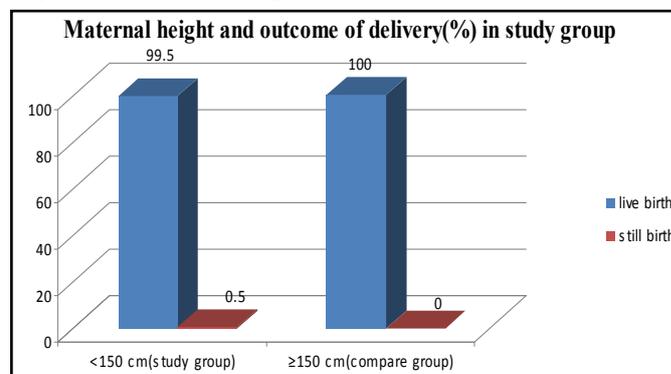
Statistical analysis showed that incidence of 3<sup>rd</sup> degree perineal tear was significantly higher in study sub group B ( $P<0.001$ ). Similarly, incidence of extension of episiotomy was significantly higher in study sub group B as compared to control group ( $P<0.002$ ). There were more cases of cervical tear in both study sub groups but figure was not statistically significant ( $P<0.11$ ). There was only one case of perineal haematoma in study sub group B.

**Table-3 Maternal height and incidence of PPH**

Height in centimeter	Post partum blood loss > 500ml		Total no. of patients enrolled	z-test	p-value
	n	%			
<145cm (study sub-group B)	11	13.75	80	-3.15	0.001
<150cm-145cm (study sub-group A)	6	5	120	0.65	0.51
≥150cm (Comparison group)	7	3.5	200		

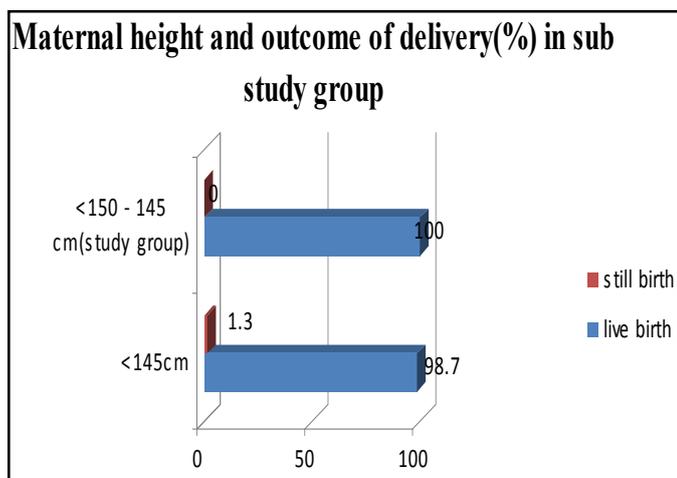
Seventeen women in the study group had PPH i.e. Post Partum blood loss more than 500 ml, whereas only 7 women in the control group had post partum blood loss more than 500ml following delivery (Table 3). This shows a significantly higher incidence of PPH in study group ( $p$  value<0.03). Similarly, incidence of PPH was significantly higher in the study sub group B as compared to study subgroup A.

**Figure- 2 Maternal height and outcome of birth:**



The figure 2 shows that there was only one stillbirth in the study group and none in the comparison group and the finding is not statistically significant ( $P<0.31$ ).

Figure-3 Outcome of delivery in short stature women:



The figure 3 shows that there is only one stillbirth (1.3%) among 80 short statured women of study subgroup B as compared to none in 120 cases of the study sub group A. This finding is statistically not significant (P= 0.11).

Table – 4 Maternal height and neonatal birth weight

Height in centimeter.	Birth weight in kg.						total	P-value.
	<2.5		2.5-3.5		>3.5			
	no	%	no	%	no	%		
<150(study group)	30	15	159	79.5	11	5.5	200	0.13
≥150 (comparison group)	18	9	166	83	16	8	200	
P-value	0.06		0.36		0.31			

In study group 15% neonates were found having <2.5 kg weight, and 9% in the control group (Table 4). This shows that increased fetal birth weight is in taller women. The short statured women have more chances of premature delivery and low birth weight neonates.

Table-5 Maternal height and neonatal birth weight

Height in centimeter.	Birth weight in kg.						total	p-value
	<2.5		2.5-3.5		>3.5			
	no	%	no	%	no	%		
<150-145cm (study sub group A)	11	9.2	102	85	7	5.8	120	0.01
<145cm (study sub-group B)	19	23.7	57	71.3	4	5	80	
p-value	0.004		0.01		0.80			

This study shows that women of lesser height (Sub group B) has increased risk of getting neonates of low birth weight (<2.5 kg). In this study 13 neonates of low-birth weight are due to pre maturity and 6 neonates of low-birth weight are due to

IUGR(Table 5).

Table-6 Maternal height and Special care baby unit (SCBU) admission

Height in cm	SCBU admission		Patients enrolled	z-test	p-value
	n	%			
<145cm(study sub group B)	27	33.75	80	3.87	0.0001
<150cm-145cm(study sub-group A)	16	13.33	120	0.01	0.96
≥150cm (Comparison Group)	27	13.5	200		

The table 6 shows that there were forty three babies in study group who needed admission to SCBU (21.5%) as compared to twenty seven babies in the control group (13.5%). There were 16 such cases in study subgroup A (13.33%) and twenty seven babies in study subgroup B (33.75 %). Statistical analysis reveals that incidence of SCBU was significantly higher in study subgroup B as compared to that in the sub group A (P=0.0001).

**DISCUSSION**

Among 1,879 primigravidas admitted in labor during the two months of data collection period; 200 cases were enrolled as study group. Two hundred similar cases who met the same inclusion and exclusion criteria were enrolled in control group. They matched with study group both in chronological as well as gestational age to minimize the effect of compounding factors as far as possible.

**Maternal outcome:**This study highlights that there is significant association (p=0.001) between short stature and caesarean delivery as thirty eight women in study group underwent caesarean deliveries (19%) compared to only sixteen women in the control group (8%).

Incidence of instrumental delivery was also higher in short stature women. Among women of study sub group B, i.e. height less than 145 cm, there was significantly more risk of instrumental delivery (P< 0.05) as well as caesarean section (P< 0.0001) as compared to the control group.

Incidence of major genital tract injury was found to be higher in the study group. Further analysis of the study sub groups revealed that; although the incidence of 3<sup>rd</sup> degree perineal tear was higher in study sub group A, it was statistically not significant when compared with the comparison group (P< 0.19); whereas the same incidence was significantly higher in study sub group B (P< 0.001) when compared with the comparison group. Similarly, incidence of extension of episiotomy was significantly higher in study sub group B as compared to control group (P< 0.002).

Incidences of four case of 3<sup>rd</sup> degree perineal tear and one case of 4<sup>th</sup> degree perineal tear as compared to none in the comparison

group suggests that shorter women are more prone to have severe perineal injuries if cephalopelvic disproportion is missed. Three out of four who had third degree perineal tear including two vacuum deliveries had given birth to babies weighing 3 kg or more suggesting again the disproportion between fetal head and maternal pelvis. The patient who had 4<sup>th</sup> degree perineal tear was 149 cm tall and gave birth to baby weighing 3.5 kg. Findings of this study suggest that the risk of severe genital tract injury is increased with decreasing height of mother. Altogether 24 cases in this study had post partum blood loss more than 500 mls including three cases that lost more than 1000 ml. of blood. The overall incidence of PPH was significantly higher among short statured women (study group) as compared to the control group ( $p$  value < 0.03). Although the incidence of post partum hemorrhage was significantly higher in the study sub group B as compared to control group ( $P= 0.001$ ), such incidence in study sub group A was not significantly higher ( $p=0.51$ ). Among the seven cases who had PPH in the control group, 2 cases had LSCS, one had forceps delivery and the other four had SVD followed by uterine atony resulting in PPH. In study sub group A, there were four cases of traumatic PPH including two caesarean deliveries, one vacuum delivery together with third degree perineal tear and one extension of episiotomy. The other two had atonic PPH. In study subgroup B, 4 cases had PPH following cesarean section, one following third degree perineal tear, one case had PPH with perineal haematoma and five of them had SVD followed by atonic PPH. There is paucity of literatures to compare our findings but there is enough evidence to suggest that shorter women are more at risk of PPH –both traumatic as well as atonic.

A population based study reported by Sheiner E, et al showed an incidence of short stature women of 3.65% among 5822 deliveries and statistically significant higher rates of Caesarean Sections (21.3%) among them compared with patients whose height was  $\geq 155$  cm.<sup>4</sup> Relatively higher rate of caesarean section (>40%) among short women (<150 cm) was reported by Sylvia Kirchengast et al from Austria in 2007.<sup>5</sup> Similar findings were reported from England and Wales by W A Liston et al in 2003 who found that short stature mother (<160 cm) had a caesarean section rate of 38% showing increase in trend with decrease in maternal height.<sup>6</sup> Apeawusu B. et al reported that there were significantly more cases whose height was less than 150 cm (10% vs. 4%) who underwent caesarean deliveries.<sup>7</sup> McGuinness BJ et al reported that risk of caesarean section increased gradually with decreasing height and reached a risk of more than 30% when height decreased to less than 30%.<sup>8</sup>

#### **FETAL OUTCOME:**

There was only one stillbirth in the study group and none in the control group and the findings are not statistically significant ( $P<0.31$ ). The only one stillbirth out of 80 cases of short statured women, belonged to study subgroup B i.e. < 145 cm in height. Impact of maternal height on the incidence of stillbirth could not be precisely established with small sample size as

perinatal deaths are relatively rare events and much bigger sample is needed to see any association. However, literatures suggest that shorter women have higher risk of adverse perinatal outcome as compared to taller women. There were three neonatal deaths in this study, one in study sub group A and two in study sub group B; as compared to none in the control group. All the three neonatal deaths were due to prematurity. There were thirty babies weighing less than 2.5 kg in study group of mothers (15% of total births) including premature babies as compared to only eighteen in control group (9%). Incidence of Low Birth Weight was higher in the study group but not statistically significant ( $P= 0.06$ ). There were eleven babies in study sub group A (9.16%) as compared to nineteen babies of low birth weight in study sub group B (23.75%). Further Statistical analysis showed that the incidence of low birth weight was higher in study sub group B when compared with comparison group ( $P= 0.0009$ ). This study suggests that chances of having low birth babies are almost 1 in 4 if women's height is less than 145 cms.

Incidence of admission to SCBU is significantly high in babies of short stature mother ( $P= 0.03$ ). Statistical analysis reveals that incidence of SCBU admission was similar in the comparison group and study subgroup A ( $P=0.96$ ) but significantly higher in study subgroup B as compared to that in the comparison group ( $P=0.0001$ ). Most of the admissions to SCBU were due to birth asphyxia in both groups. Though birth asphyxia is influenced by many factors, many studies indicate that birth asphyxia occurs more significantly among babies born to short statured mothers. As supported by other literatures, short women are at increased risk of prematurity, low birth weight as well as traumatic delivery including more instrumental births leading to increased need of SCBU admission. Camilleri AP in 1981 reported incidence of Birth asphyxia of 7.79% of short stature mother (5 ft. or less) in comparison to 4% among tall mothers among Maltese women.<sup>9</sup>

#### **Cut-off point of height as screening for high risk pregnancy:**

In different literatures, different heights are mentioned as cut-off point for identification of short statured women having more risks of adverse pregnancy outcome. It is suggested that, even though short stature is a risk factor for CPD; it is needed to determine local Cut off points for screening purposes. Screening for CPD risk factors can reduce the likelihood of mothers to suffer from prolonged labor and its sequences. If the western figure of 150 cm is applied as the cut-off point for our study; then a high percentage of women fall in high risk group. So the local characteristics should help as the guidelines while considering any high risk factor in any population. Prasad M Al-Taher H at Department of obstetrics Gynecology, Queen Elizabeth Hospital, Kings Lynn, UK in 2002 proposed a cut off height of 160cm as a screening tool to predict a need for caesarean<sup>10</sup> Tsu VD et al in the greater Harare area of Zimbabwe in 1992 reported that woman with a height less than 160cm had

a relative risk for CPD of twice than that a woman at a height of 160 cm or above.<sup>11</sup> Similarly, Kaiser PS et al. (2001) from France suggested 155 cm as cut off point<sup>12</sup>, whereas according to Lidelele H B et al from Zaire in 2000, maternal height <150 cm were associated with increase percentage of cephalopelvic disproportion and increase caesarean section rate.<sup>13</sup> Rey H. et al from Cali, Colombia (1989) Short maternal height (i.e., <150 cm) was associated with cephalo-pelvic disproportion.<sup>14</sup>

In our study, it is very clear that pregnancy outcome was more adverse among women of height < 145 cms compared to the comparison group ( $\geq 150$  cms) or study sub group A (>145-150 cms). This study highlighted that there was significant association between short statured women of <145 cm and caesarean delivery (P- 0.001) but not so significant in heights of >145cm. Similarly, incidence of post partum hemorrhage was significantly higher in sub group B than sub group A. Incidence of 3<sup>rd</sup> degree perineal tear, extension of episiotomy, LBW babies and admissions to SCBU were all significantly higher in sub group B than sub group A.

Thus findings of this study suggest that in our hospital's obstetric population, cut off point of 145 cm height is justified to define a short statured woman, which is our current protocol.

#### CONCLUSION

There was significant association between short stature and the risk of caesarean delivery. Among women of study sub group B, there was significantly more risk of instrumental delivery as well as caesarean section. Incidence of major genital tract injury was found to be higher in the study group, though statistically not significant. Incidence of third degree perineal tear and extension of episiotomy was significantly higher in study sub group B. Similarly, incidences of PPH, LBW and admissions to SCBU were significantly higher among short stature women having height less than 145 cms.

In our study, it is very clear that pregnancy outcome was more adverse among women who were < 145 cms compared to the comparison group ( $\geq 150$  cms) or study group A (>145-150 cms). Findings of this study suggests that in our hospital obstetric population, cut off point of 145 cm is justified which is our current protocol to define a short stature woman.

#### RECOMMENDATION

The present study is too small to establish exact gravity of the situation. However study in large scale would be more confirmative to identify and to standardize a cut-off point for identification of short stature Nepalese women. A large scale study is needed to fix cut-off point of maternal height for safe mode of delivery and pregnancy outcome. However, based on this study it is recommended that women whose height is less than 145 cms should be counseled and referred to health facilities where comprehensive obstetric care services are available, and, preferably these women should be sent to

maternity homes beforehand for safe confinement.

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Original Article

# Hemodialysis at Charak Hospital and Research Center – The first year's experience

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## Key words:

chronic renal failure  
end stage renal disease  
hemodialysis  
developing world

## ABSTRACT

**Background:** Chronic kidney disease and acute renal failure is worldwide a significant cause of mortality and morbidity. While in the predialysis era these patients' survival was very limited, nowadays the accessibility of dialysis has changed the outcome.

**Objective:** The aim of this study was to analyse the characteristics, attendance pattern, adherence and outcome of patients, who have undergone hemodialysis in the Charak Hospital and Research Center (CHRC) at Pokhara, Nepal.

**Methods:** A retrospective data review was carried out among patients, who have attended at least one hemodialysis session in the Hemodialysis Unit at CHRC, between 16<sup>th</sup> November 2009 and 15<sup>th</sup> November 2010.

**Results:** During the study period total number of enrolled patients were 75. Among them female were 30 (40%) and male were 45 (60%). Most patients (76%) were above 40 years old. 7 patients (9.33%) had acute renal failure, while the rest 68 patients (90.67%) had chronic kidney disease (CKD). In the CKD group 28 out of 68 patients (41.2%) discontinued hemodialysis and lost for follow up. Among them 24 patients discontinued hemodialysis within one month from starting. Majority of patients started hemodialysis through temporary vascular access, while only 18 out of 75 (18.7%) had arterio-venous fistula. In large number of cases the cause of chronic kidney disease could not be identified (48.5%). In the rest, the leading cause of renal failure is chronic parenchymal disease 13 of 68 patients (19.1%), followed by hypertensive nephropathy (17.6%), obstructive nephropathy (7.4%), diabetes mellitus (7.4%).

**Conclusion:** The results of the study correlate with other centers' reports from our region (Nepal and South-East Asia).

## INTRODUCTION

Chronic kidney disease and acute renal failure is worldwide a significant cause of mortality and morbidity. While in the

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predialysis era these patients' survival was very limited, nowadays the accessibility of dialysis has changed the outcome. In developed countries where the health insurance system provides full coverage for the dialysis services, the disease can be managed in high optimal level. However chronic kidney disease is still a major public health problem, putting huge burden on the health insurance systems.<sup>1</sup>

On the other hand in developing countries, especially where

health insurance is less developed, most patients have to bear significant financial burden, thus selecting the renal replacement therapy (RRT) access to only those who can afford it.<sup>2</sup>

Chronic kidney disease is defined according to the presence or absence of kidney damage and level of kidney function - irrespective of the type of kidney disease (see Table 1 and 2.) End stage renal disease (ESRD) is a federal government defined term that indicates chronic treatment by dialysis or transplantation.<sup>3</sup>

**Table 1. Definition of CKD**

<p><b>Structural or functional abnormalities of the kidneys for <math>\geq 3</math> months, as manifested by either:</b></p> <p><b>1. Kidney damage, with or without decreased GFR, as defined by</b></p> <ul style="list-style-type: none"> <li>• pathologic abnormalities</li> <li>• markers of kidney damage, including abnormalities in the composition of the blood or urine or abnormalities in imaging tests</li> </ul> <p><b>2. GFR <math>&lt; 60</math> ml/min/1.73 m<sup>2</sup>, with or without kidney damage</b></p>
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**Table 2. Stages of CKD**

Stage	Description	GFR (ml/min/1.73 m <sup>2</sup> )
1	Kidney damage with normal or $\uparrow$ GFR	$\geq 90$
2	Kidney damage with mild $\downarrow$ GFR	60-89
3	Moderate $\downarrow$ GFR	30-59
4	Severe $\downarrow$ GFR	15-29
5	Kidney failure	$< 15$ (or dialysis)

In ESRD, the renal replacement therapy (RRT) options are: hemodialysis, peritoneal dialysis and renal transplantation. Hemodialysis is the most frequently used form of RRT. The ideal solution is renal transplantation, because it is the most effective and has the best survival rates.

The incidence of ESRD the United States is about 330 per million population (pmp).<sup>4</sup> However in developing countries it is estimated to be much lower. According to datas from South Asian countries (eg. Pakistan, India and Bangladesh), it is estimated to be 100 pmp.<sup>5,8</sup> Although the credibility of statistics from many developing countries may be questionable, the majority of experts agree that 150 pmp is the average incidence of ESRD.<sup>4</sup>

In a recent nepali study, it was calculated, that less than 1% of the total estimated ESRD population received a form of RRT.<sup>9</sup>

In CHRC, Pokhara, Hemodialysis Unit was established with two machines in response for the growing demand in the Western Region of Nepal. The Unit was opened on the 16th November 2010.

## MATERIALS AND METHODS

A retrospective data review was carried out among patients, who had undergone at least one hemodialysis session in the Hemodialysis Unit at CHRC, between 16<sup>th</sup> November 2009 and 15<sup>th</sup> November 2010. Patient characteristics were analysed and mean  $\pm$  SD calculated with Microsoft Office Excel 2007 software.

## RESULTS

Total number of patients attended the Hemodialysis Unit between 16th November 2009 and 15th November 2010 were 75. Among them female were 30 (40%) and male were 45 (60%). Age ranged from 11 years to 82 years. Most patients were above the age of 40 (see Table 3.) Mean age of the study population was  $50.6 \pm 17.3$  years.

**Table 3. Age distribution**

Age	No. of patients
0-19	6 (8%)
20-39	12 (16%)
40-59	33 (44%)
>60	24 (32%)
<b>Total No.</b>	<b>75 (100%)</b>

Among the 75 patients 7 (9.33%) had indication for hemodialysis due to acute renal failure (ARF), the rest 68 patients had chronic renal failure.

In the ARF group 3 patients had acute renal failure following multiple wasp bites and rhabdomyolysis and/or hemolysis (see Table 4.). Among the three patients one died and two recovered. One patient had ARF as a postoperative complication, he recovered after 5 sessions of hemodialysis. Two patients had ARF as a consequence of sepsis (multiorgan failure) and one patient had drug induced rhabdomyolysis, all three patients died.

In the CKD group the etiology of the renal disease shows the following pattern: chronic parenchymal disease (eg. glomerulonephritis, interstitial nephritis, etc.) 13 patients (19.1%), hypertension 12 patients (17.6%), obstructive uropathy 5 patients (7.4%), diabetes mellitus 5 patients (7.4%), and the cause could not be determined in the majority of the patients (48.5%) (see Table 4.).

**Table 4. Etiology of renal failure**

Acute renal failure		Chronic kidney disease	
ARF due to wasp bite with rhabdomyolysis and/or hemolysis	3	Chronic parenchymal disease	13 (19.1%)
Sepsis with multiorgan failure	2	Hypertension	12 (17.6%)

Postoperative ARF	1	Obstructive uropathy	5 (7.4%)
Drug induced rhabdomyolysis with ARF	1	Diabetes mellitus	5 (7.4%)
		Undetermined	33 (48.5%)
<b>Total No</b>	<b>7 (100%)</b>	<b>Total No</b>	<b>68 (100%)</b>

About half of the CKD patients continued hemodialysis only for less than 1 month (55.9%) (see Table 5.). Most of these patients discontinued dialysis after few sessions and they were lost for follow up (63.2%). Among the study population 16 patients (23.5%) are still continuing hemodialysis, 10 patients (14.7%) were transferred to other centers, and 4 (5.9%) patients received renal transplantation. 10 patients (14.7%) died while still attending regular maintenance hemodialysis.

**Table 5. CKD stage V. patient outcome on dialysis**

Outcome	Duration of HD			Total No.
	< 1 month	1-3 months	>3 months	
	No. of patients			
Still continuing	4	4	8	16 (23.5%)
Transfer to other center	5	4	1	10 (14.7%)
Went for transplant	1	-	3	4 (5.9%)
Died while continuing HD	4	2	4	10 (14.7%)
Discontinued HD and lost for follow up	24	1	3	28 (41.2%)
<b>Total No. of patients</b>	<b>38 (55.9%)</b>	<b>11 (16.2%)</b>	<b>19 (27.9%)</b>	<b>68 (100%)</b>
<b>Mean No. of HD done (<math>\pm</math> SD)</b>	<b>3.2 <math>\pm</math> 1.8</b>	<b>11.1 <math>\pm</math> 3.2</b>	<b>31.7 <math>\pm</math> 19.9</b>	

The baseline blood parameters and vital parameters are seen in Table 6.

**Table 6. Baseline blood parameters of study population**

Urea	142.35 $\pm$ 63.1 mg/dl	Pre HD Systolic BP	135.40 $\pm$ 23.10 mmHg
Creatinine	8.35 $\pm$ 4.85 mg/dl	Pre HD diastolic BP	80.07 $\pm$ 13.21 mmHg
Sodium	140.40 $\pm$ 6.11 mmol/l	Post HD systolic BP	140.67 $\pm$ 23.03 mmHg
Potassium	4.21 $\pm$ 0.91 mmol/l	Post HD diastolic BP	81.20 $\pm$ 12.81 mmHg
Albumin	3.32 $\pm$ 0.43 g/dl	Pre HD weight	52.92 $\pm$ 10.09 kg

The most frequently used vascular access at the time of first hemodialysis (see Table 7.) was the internal jugular double lumen catheter (48%). While only smaller number of patients started dialysis with the optimal arterio-venous fistula (26.7%).

**Table 7. Vascular access at the time of first hemodialysis in our unit**

Access form	No. of patients
AV fistula	14 (18.7%)
Femoral catheter	20 (26.7%)
Jugular DLC catheter	36 (48%)
Permanent catheter	2 (2.7%)
Subclavian DLC catheter	3 (4%)
<b>Total</b>	<b>75 (100%)</b>

## DISCUSSION

Mean age of the study population was 50.6  $\pm$  17.3 years. Older than reported in other South Asian countries - Bangladesh, India and Pakistan (38-42 years) [7, 10, 11], but younger than found in USA (> 60 years) [12].

Age itself is a risk factor for developing kidney disease, as glomerular filtration rate also decreases with age. However, other risk factors (eg. hypertension and diabetes mellitus) are also more common in the elderly population.

The male predominance (60%) is similar to other study reports from Nepal, eg. 57% at NMCTH [13] and 65% at Bir Hospital [9]. It is also similar to reports from other countries in the developing world eg. 67.8% in India [14] and 64.5% in Saudi Arabia [15].

In the ARF group 3 patients out of 7 recovered, which correlates with the usual ARF mortality (50%). The etiology in the CKD group is similar to other studies in Nepal and in other countries from the developing world [4, 13, 16]. However in about half of the patients, the etiology could not be determined due to the late stage of the disease. In hypertensive patients it is also difficult to determine whether the hypertension is the cause or the consequence of the renal disease.

High number of patients with chronic kidney disease have discontinued hemodialysis after few sessions. The main reason behind is the lack of financial support. The average twice weekly hemodialysis cost is about 30-40 000 Nepali rupees (450-600 USD) per month. Only a very small percentage of the whole population is able to carry this financial burden for long.

One fourth of patients are still continuing hemodialysis in our center, while another one fifth of them are either continuing in other centers or got a renal transplant. Among those who continued hemodialysis regularly, 10 out of 40 patients (25%) died during the one year period.

At the time of starting hemodialysis, the temporary vascular access is dominant. This is the consequence of late diagnosis or late referral to nephrologist.

**CONCLUSION**

Both acute and chronic renal failure carry a high percentage of mortality among the affected patients. While for acute renal failure the course of disease is most often limited, the mortality will depend on the underlying disease and the patient's condition.

In our study population adherence to hemodialysis among the CKD stage V. patients was poor, 41.2 % of them discontinued and lost for follow up. Most of these patients have discontinued hemodialysis within 1 month after starting it.

Mortality among the regular patients was 25% (10 by 40) within the one year period.

It can be concluded that in our population setting, dialysis outcome and adherence is highly influenced by financial factors of the individual. The introduction of effective health insurance systems could overcome these irregularities. However adequate level of employment of the population is a must to reach this.

Population based screening programs could help to detect CKD at earlier stages and stop or delay the progress of the disease.

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Original Article

# Analysis of laparoscopic cholecystectomy conversions in Gandaki Medical College, Charak Hospital, Pokhara, Nepal

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## Key words:

Laparoscopic holecystectomy  
cholelithiasis  
conversion

## ABSTRACT

**Introduction:** After introducing minimal invasive surgery specially laparoscopic cholecystectomy (LC) different centres have reported different conversion rate (CR) to open cholecystectomy (OC) and different reasons for conversion. The common reported etiologies of such a conversion are uncontrollable bleeding, adhesions, inflammation, anatomical variations, entailed common bile duct (CBD) exploration, trauma of bile duct and other hollow viscera, presence of malignant pathologies, and technical failures.

**Objective:** To determine the conversion rate of laparoscopic cholecystectomy (LC) and its reasons at Gandaki Medical College (GMC), Charak Hospital and research centre (CHRC), Pokhara Nepal.

**Methods:** This was a retrospective study carried out at GMC, CHRC, Pokhara. from April 2009 to March 2011. All patients who were scheduled LC for Symptomatic cholelithiasis, GB polyps, acute calculus or acalculus cholecystitis were included in this study. Those with history of pancreatitis, jaundice, common bile duct dilatation, choledocholithiasis GB Wall thickness more than 1cm, h/o laparotomy and obvious gall bladder mass were excluded.

**Results:** A total of 397 patients underwent LC during the study period. The mean Operating time was 50 minutes and average hospital stay was 3.5 days. The conversion rate was 4.03 %, with commonest cause being dense adhesions.

**Conclusion:** CHRC has a low conversion rate and reasons are typical to CHRC

## INTRODUCTION

Open cholecystectomy has being a gold standard for the treatment of gallbladder diseases for more than 100 years since Carel Johann Langenbuch has performed first open

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cholecystectomy in 1882.<sup>1</sup>

First laparoscopic cholecystectomy in human has been performed in 1987 by Dr. Philip Mouret in France used to contain a long list of local and systemic contraindication conditions.<sup>2</sup> This list has progressively become shorter. Acute cholecystitis, previous scars, morbid obesity, common bile duct (CBD) stones and compensated cardiac and pulmonary diseases are no longer considered as contraindications to LC.<sup>3-7</sup> LC become the new gold standard and almost replaced open

cholecystectomy for the treatment of gallbladder disease, now more than 90% cholecystectomies are performed laparoscopically.<sup>8,9</sup> In Nepal, it is not reported that when and where first laparoscopic cholecystectomy was performed. In our Gandaki Medical College Charak Hospital, with minimal set up we have started laparoscopic surgery.

Elective laparoscopic cholecystectomy has been established as gold standard method for symptomatic gall stone disease.<sup>10</sup> Laparoscopic cholecystectomy has proved to be an effective and safe procedure both in elective and emergency conditions; however, conversion to open surgery is inevitable in some cases. The conversion causes elongation of hospital stay, increased total cost, and dissatisfaction of the patients.<sup>11</sup> Now evolved to the point where it has replaced the open technique. Perceived advantages of LC, compared with the open technique, include earlier return of bowel motility, less post operative pain, better cosmetic results, shorter hospital stay resulting in equal or lower hospital costs and early return to work.<sup>12</sup> Emergency LC for the management of acute cholecystitis is conventionally considered to be associated with more complications and increased risk of common bile duct injury.<sup>13</sup> With improvement in expertise and progression of learning curve, some surgeons have recommended LC as preferred treatment of acute cholecystitis.<sup>14</sup> The aim of this study was to determine the conversion rate of LC and its causes at GMC,CHRC.

## METHODS

This retrospective study was carried out at GMC,CHRC Hospital, Pokhara from April, 2009 to March, 2011. Medical records of all patients who underwent LC were reviewed. Data recorded included demographic information, past medical history, indication for operation, duration of operation, operative findings, reason for conversion, postoperative complications, and histopathology reports. All patients who were scheduled for LC having Symptomatic cholelithiasis, GB polyps, acute calculus or acalculus cholecystitis were included in the study. Those with history of pancreatitis, jaundice, common bile duct dilatation (>8mm in diameter on USG), choledocholithiasis GB Wall thickness more than 1cm, H/O of laparotomy and obvious gall bladder mass were excluded.

Preoperative work up included a complete blood count, blood urea, blood sugar, electrolytes, liver function tests, hepatitis profile, X-ray chest and ultrasound of abdomen. The operation was performed with standard 3 port technique, using carbon dioxide for peritoneal cavity insufflation. Cystic artery and cystic duct were clamped with metallic clips separately. Following gall bladder removal, drain was placed selectively in difficult cases with risk of postoperative bleeding. Antibiotic prophylaxis was ensured with intravenous doses of third generation cephalosporin. All patients had oral liquids and

were encouraged to proceed with food in the evening after operation, provided there was no nausea and vomiting.

## RESULTS

Out of 397 patients, 309 (84.7%) were women and 88 (15.3%) men. The mean age was 40 years (range 12-88). Symptomatic gallstones were most common indication for LC (Table 1).

Table 1. Indications of laparoscopic Cholecystectomy (n= 397).

No	Indication	No. of pts	%
1	Symptomatic cholelithiasis	284	71.53
2	Ac cholecystitis	65	16.37
3	G B polyp	48	12.1

Sixteen (4.03%) patients required conversion to open procedure (Table 2)

Table 2. Reasons for the Conversion to open Cholecystectomy (n=16).

No	Reason	No of pts	%
1	Dense adhesions (inadequate exposure)	11	68.75
2	Bile duct injury	2	12.5
3	Massive oozing from liver bed	1	6.25
4	Instrumental failure	2	12.5

The most common cause for conversion was dense adhesions around gall bladder making dissection around the Calot's triangle difficult (Table 2). The mean operation time was 50 minutes with the range of 20 to 195 minutes. The average length of hospital stay was 3.5 days.

## DISCUSSION

After introduction of lap chole initially, the complication rate with LC was high but as the experience has grown, it has reached a remarkably low level at 2.0-6.0%.<sup>15</sup> Although the incidence is still higher or equal than the incidence after open surgery. Since 1990 many surgeons have attempted LC with reasonable success in difficult cases too.<sup>16-19</sup> Their results indicated that extensive experience with both open and laparoscopic biliary tract surgery is the most important ingredient of a successful outcome in the setting of difficult cases too.

Laparoscopy cholecystectomy (LC) has rejuvenated general surgery and in a very short time has become the gold standard operation for gall bladder disease. Born in secrecy and developed under an atmosphere of skepticism and hostility, LC triumphed and was ultimately quite acceptable.<sup>20</sup> Conversion to open technique is considered a major morbidity of LC as it loses its supremacy over open technique once the conversion takes place. The common etiologies of such a conversion are

uncontrollable bleeding, adhesions, inflammation, anatomical variations, entailed common bile duct (CBD) exploration, trauma of bile duct and other hollow viscera, presence of malignant pathologies, and technical failures. These causal variables are intra-operative events and could not be used as factors to predicate conversions before operations.<sup>2,3</sup>

The conversion rate in this study was 4% and this is comparable to the conversion rate of 2.2% to 13.9% reported in literature.<sup>21-25</sup> However, the rate of conversion is high amongst studies from the Asian countries as compared to those from western world<sup>26</sup> (Table 3). In most cases, dense adhesion around the gallbladder and bile leakage, as well as uncontrolled bleeding and bowel injury during insertion of Veres needle or dissection of dense adhesions were the main reasons for conversion to the open procedure.

**Table 3. Comparison of Rates of Conversion**

Study	Place	Year	No. of cases	%
Magee et al	UK	1996	443	10
Vecchio et al	USA	1998	114005	2.2
Guraya et al	Saudi Arabia	2004	549	2.9
Dholia et al	Larkana	2005	443	11.5
Tarcoveanu	Romania	2005	6985	3.2
Lim et al	Singapore	2005	149	11.5
Butt et al	Lahore	2006	300	4
W.Memon et al	Hyderabad	2007	216	4
Current study	CHRC ,pkr	2011	397	4.03

Jaffary et al in their study of 93 patients undergoing LC found a conversion rate of 7.53%, instrumental failure which is 12.5% is being the commonest cause and instruments that failed during surgery included insufflators, camera, monitor and clip applicator failure.<sup>27</sup> In another large study of 549 patients undergoing LC, the conversion rate was 2.9%, difficult dissection being the commonest cause followed by excessive bleeding, suspected duodenal and colonic injury.<sup>28</sup> The identification of factors that reliably predict the likely need to convert LC to open procedure would decrease the incidence of intraoperative complications and help in patient counseling about LC before surgery. In one study history of acute attack for more than 72 hours was a strong predictor of conversion even if patient has minimal signs and symptoms.<sup>29</sup>

Our study, most conversions happen after a simple inspection or a minimum dissection, and the decision to convert should be

considered as a sign of surgical maturity rather than of failure. Conversion should be opted for in the beginning and at the time of recognition of a difficult dissection rather than after the occurrence of complication.<sup>30,31</sup> We believed that it is vital for the surgeons and patients to appreciate that the decision to go for conversion is not failure but rather implies safe approach and sound surgical judgment. It is therefore, mandatory to explain the patients about possibility of conversion to open technique at the time of taking consent for LC. In conclusion, LC is a safe and minimally invasive technique, with only 4% conversion rate .

This study suffers from certain limitations. First of all, the data collection was performed in a retrospective fashion. This method naturally fails to be as accurate as prospective data collection. We regarded a surgeon as experienced after performing 50 LCs. This seems to be a relatively rough criterion to determine the level of experience of a surgeon.

## CONCLUSION

Laparoscopic cholecystectomy is a safe method of treatment with very low conversion rate and the commonest cause of conversion in this study was the presence of dense adhesions.

Our study emphasizes that although the rate of conversion to open surgery is low in experienced hands the surgeon should keep a low threshold for conversion to open surgery and it should be taken as a step in the interest of the patient rather than be looked upon as an insult to the surgeon.

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#### Editorial Comments:

*Conversion from LC to OC is an indication of maturity. As the emphasis is totally shifted to Laparoscopic procedures we are reaching a situation where experience of open cholecystectomies is being limited. A difficult LC needing conversion will automatically mean a difficult OC too. Here the reason of instrument failre is at 12% and this is something that could have been averted with proper equipment maintenance and replacement.*



Original Article

# Pre-hospital transport to emergency room in Pokhara, patient's perspectives

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## Key words:

ambulance  
emergency medical service  
transportation

## ABSTRACT

**Introduction:** As in most of the developing countries an effective Emergency medical service system is in preliminary stage in Nepal. To develop an effective Emergency Medical Service system in Pokhara, one of the urban cities of Nepal, a study on scale of problem and facilities available to find out the present situation of emergency medical service has been done.

**Methods:** Prospective observational study was carried out on 886 patients presenting in Emergency Department at Gandaki Medical College, Teaching Hospital (Charak) during the period of 1 month starting from 1st Chaitra 2066 to 31<sup>st</sup> Chaitra 2066 (14<sup>th</sup> March 2010 to 13<sup>th</sup> April 2010) Enquiry was made directly with patient, relatives or the person who brought the patient to the Emergency Department and interviewed on mode, preference and satisfaction of transport used and whether an ambulance is called or not. Information on type of ambulance, the number of ambulances, trained personnel, equipment and oxygen availability, were obtained by interviewing directly with ambulance service providers of Pokhara City

**Results:** Only 13.54% of patients came in ambulance. 86.45% patients attended ED by other mode of transport. More than half of the patients 53.27 % came to the Emergency Department in a Taxi. 11.39% used Bus whereas 10.38% came in private vehicle, 4.17% came by bike and rest 7.22% came by other modes of transportation. 99% of patient or relatives were found satisfied with transport they used. Only 15.46% of all attending Emergency department of GMC Charak Hospital preferred ambulance, most 84.54% preferred other mode of transport.

**Conclusions:** Most of the people use any mode of transport which is available easily and prefer to reach hospitals as soon as possible rather than calling ambulance. People use ambulances only as a mode of transport same as other means of transport. Emergency Medical Service System is needed to be improved to prevent the preventable death and disability of people of Pokhara City.

## INTRODUCTION

Emergency medical service provides pre-hospital emergency medical service and transport the patient to definitive care center. The goal of emergency medical services is to provide

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pre-hospital treatment to those in need of urgent medical care and arrange timely removal of the patient to definitive care center. Emergency Medical Service reflects a change from a simple transportation system (ambulance service) to a system in which actual medical care is given addition to transportation.

The sophisticated, full fledged, developed Emergency medical service (EMS) is limited to developed countries. Developing countries are slowly developing emergency medical service system, although most services are localized to the urban areas,

due to the increasing accessibility of road to the rural areas EMS is spreading to the nearby areas of cities.

Although inadequate, ambulance service is available in the city and its periphery. Sophisticated emergency medical service which includes well equipped ambulances and well trained medical staffs who can provide pre-hospital emergency medical care is lacking in Pokhara city. Emergency medical service can save the life of many people. To develop an effective EMS system in Pokhara City, a study on the scale of the problems and existing facilities has been carried out.

## METHODS

A prospective observational study was carried out in all the patients attending Emergency Department of the Gandaki Medical College, Teaching Hospital (Charak) from March 14, 2010 - April 13, 2010. Ethical permission from the hospital was obtained before the study to be carried out. Verbal consent was taken from patients and /or accompanying relatives before interview. The questionnaire consisted of information on the mode of transport used, ambulance available or not, ambulance was called or not, satisfaction with mode of transport or not and preference between calling the ambulance and use any mode of transport available.

Information on types of ambulances, the number of ambulances, trained personnel, equipment and oxygen availability, were obtained from ambulance service providers of Pokhara City.

## RESULTS

Total 886 patients attended Gandaki Medical College Teaching Hospital Charak, Emergency Department. Out of 886 patients 461 (52.03%) were female and 425 (47.9%) were males.

Most frequent visitors of the Emergency Department were the patients of age group 15-44 years with slightly more females than males (Table 1). More than half of the patients that is 472 (53.3%) were related to economically active population.

Table 1. Age and sex distribution of patients

Age (yrs)	Female	Male	Total Number	%
0-4	12	24	36	4.1
5-14	39	43	82	9.3
15-44	248	224	472	53.3
45-64	107	68	175	19.7
> = 65	55	66	121	13.6
Total	461	425	886	100.0

Only 13.54% of patients attended GMC Charak hospital Emergency Department by ambulance (Table 2) Most of the patients used Taxi which is 53.27% followed by 10.38% came in private vehicle. 11.39 % came in bus where as 4.17% used motorbike and the rest 7.22% arrived in other mode of

transportation.

Table 2. Mode of transport used by Patients

	No. of Patients	%
Taxi	472	53.27
Ambulance	120	13.55
Bus	101	11.39
Own	92	10.39
Bike	37	4.18
Others	64	7.22
Total	886	100.00

Most of the patients 86.45% came to GMC Charak hospital ED by other mode of transport than ambulance. Out of total 886 patients 137 (15.46%) called ambulance and only 120 patients (13.54%) arrived in ambulance, one of the reason not coming in ambulance is unavailability of ambulance on time

Majority of patient (84.54%) preferred to use any mode of transport available where as minority (15.46 %) of patients were in favor of calling the ambulance. 99% of patient or patient relatives were found satisfied with transport they used and only 1% were found unsatisfied with the mode of transport they used.

Information from service providers showed that there are 15 service providers with 16 ambulances in Pokhara City. More than 50% of ambulances are small vans converted into ambulances. 11 ambulances are belonged to hospitals, most of them provide limited services for transportation of patients and some of the ambulances do not provide service for public demand. All the ambulances are supplied with oxygen cylinders, but none of the ambulance has trained man power and other essential equipments. Depending on the condition of patient some of the hospital related ambulances are occasionally accompanied by health manpower and some essential equipment during transportation of patients from hospital to hospital.

## DISCUSSION

Study shows that the ambulance service in Pokhara City is inadequate and ineffective in terms of Emergency Medical Service. This study showed only 15.46% of all attending Emergency department of GMC Charak Hospital called for ambulance and only 13.54% used ambulance. Most of patient preferred to use any mode of transport which is easily available where as only minority of patients were in favor of calling the ambulance. Almost all of patient or patient relatives were found satisfied with transport they used and only few were found unsatisfied with the mode of transport they used.

Ambulances in Pokhara are lacking in trained health manpower and proper equipments. Some of the ambulance carry oxygen cylinder with them, expect giving oxygen, ambulance service

does not provide any pre-hospital treatment to the patient. Ambulances are merely considered as transportation vehicle which carry patient to the hospital. This shows pre-hospital treatment service system does not exist in Pokhara.

Emergency Medical Service System in Pokhara needs to be improved. Initiative should be taken by governmental, non-governmental or any social service organization to improve the Emergency Medical Service System so that preventable death and disability of people in Pokhara can be prevented.

## CONCLUSION

This study shows that most of the patient come to emergency department by any mode of transport which is easily available. Ambulances in Pokhara do not have trained staff and are not properly equipped and it does not provide any other hospital treatment except giving oxygen occasionally.

## LIMITATION

Limitation of the study was that the study was conducted in emergency department of a single hospital of Pokhara although there are other general and private hospitals in the city, mode of transport in those hospitals may be different.

## ACKNOWLEDGEMENT

We thank Medical Officers **Tripathee NR, Gurung A, Gurung J, Poudel S, Subedi A, Tripathee S, Subedi A. for helping in collecting the data.**

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## Editorial Comments:

*This is a thought provoking article. Tumors and most other diseases have potential to be eradicated by genetic surgery. Trauma will and continue to grow in numbers and severity. Prehospital phase is the weakest and the most critical link of this chain. Focus on this phase is a creditable first step towards provision of trauma care.*



Original Article

# A cross sectional study of assessment of relevance and effectiveness of CHW development system

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## Key words:

Community health  
Work force  
SEAR  
Relevance  
Effectiveness

## ABSTRACT

**Introduction:** Community Health Workers were in the fore front workforce to bring about change through community health programmes to national levels. In Bangladesh also, there are different categories of health workforce serving in the health care delivery system.

**Objectives :** To assess relevance and effectiveness of community health workforce (CHW) development system in Bangladesh.

**Methods :** This descriptive type of cross sectional study was conducted adopting purposive sampling technique. The data were edited, processed and was analysed by using SPSS soft ware and also few parts manually. No strong ethical issues were involved in this activity. Prior permission was taken from the concerned authority. Confidentiality and anonymity were assured and maintained.

**Results :** Study revealed that all the respondents (100%) are in favour of production of CHW in Bangladesh

**Conclusion:** Study revealed that there is strong & logical relevance for the production of CHW in Bangladesh. So the existing Human Resource for Health (HRH) policy is to be revised & revisited as a time felt need to develop more competent CHW for Bangladesh to serve the marginalized, terminal, people of remote, rural & hard to reach areas.

## INTRODUCTION

Community health workers (CHW) are lay members of communities who work either for pay or as volunteers in

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association with the local health care system in both urban and rural environments. They have been identified as community health advisors, lay health advocates, promoters, outreach educators, peer health promoters, peer health educators and community health representatives. CHWs offer interpretation and translation services, provide culturally appropriate health education and information, assist people in receiving the care they need, give informal counseling and guidance on health

behaviors, advocate for individual and community health needs, and provide some direct services such as first aid and blood pressure screening. They are community members who serve as frontline health care professionals. Generally they work with the underserved and are indigenous to the community and play a pivotal role in meeting the health care needs of frontier communities.

They help increase access to health services, improve quality of care, reduce health care costs, and contribute to broader social and community development.<sup>1</sup>

As “in-between people,” CHWs “draw on their insider status and understanding to act as culture and language brokers between their own community and systems of care.”<sup>2</sup>

CHWs may be paid or unpaid/volunteer, and have varying levels of job-related education and/or training. According to the National Rural Health Association, “the most significant commonalities of CHW programs are that:

- they are focused on reaching hard-to-reach populations;
- the workers usually are indigenous to the target population;
- their expertise is in knowing their communities rather than formal education”<sup>3</sup>

Community Health Workforce development has a rich history in South East Asian Region (SEAR). In 1926 the first Community Health Unit was established in Kalutara, a small district in Sri Lanka. Since then many of the regional countries like, Thailand, Myanmar, India etc practiced different types of community based health workforce depending on the unique country requirements. In 1978 after the formal Alma Ata Declaration all most all the member countries are practicing many of the elements of the Primary health care (PHC). It has been 31 years, since the Alma Ata Declaration on Health for All through PHC. Community Health Workers were in the fore front workforce to bring about change through community health programmes to national levels.

Despite the importance of CHWs, the challenges of providing them with high-quality training opportunities can be problematic. In an issue paper on community health advisors, the National Rural Health Association (NRHA) states, “training of CHAs is variable in terms of quality and content” and considers it to be a major challenge to community health advisor programs.<sup>4</sup>

## JUSTIFICATION

In Bangladesh there are different categories of health workforce serving in the health care delivery system named FWA, FWV, HA, SBA etc. But there are less formal academic institutes from where such types of different health workforces are produced. Within the last 3 years government approved 14 institutes to produce CHW through one year certificate course who will mainly serve in the non govt. sectors.

Most of the CHW get training after recruitment. The process of production of CHW is not effective, and as well as not need based and also not institutionalized. So it is very time felt need to assess the relevance and effectiveness of CHW development system in Bangladesh. In our context, effectiveness means “doing the right thing” and relevance refers to the pertinence, or applicability of the activity of health workforce to the community.

## GENERAL OBJECTIVES

To assess the relevance and effectiveness of community health workforce development system in Bangladesh.

## SPECIFIC OBJECTIVES

To identify the present status and to assess the strengths, weaknesses, opportunities & threats of community health workforce development system in Bangladesh in terms of infrastructures, logistics, teaching facilities and manpower for production of community health workforce.

## METHODOLOGY

The study was a descriptive type of cross sectional study that took place in different districts of Bangladesh. Participants were the directors, administrators, principals and teachers of different institutes, /organizations and also Community health Workers for the period of 6 months (1<sup>st</sup> November 2010-30<sup>th</sup> April 2011).

Available documents on CHW production & organization in govt. and non govt. sectors of Bangladesh were studied. Purposive sampling was done and questionnaire & checklist for data collection were developed

after literature review followed by consultation with the concerned persons and subject specialists.

Pre-testing of the questionnaire & checklist were done outside the study area. According

to the feed back of the pre testing, corrections were made in the

tools. Questionnaire & checklist were used for the collection of informations from the institutes/ organizations. Data was also collected sending questionnaire & checklist and getting back those by currier service after telephonic communication.

The data were then edited, processed and was analysed by using SPSS soft ware and also few part manually.

Regarding ethical issues, prior permission was taken from the concerned authority. Confidentiality and anonymity were assured and maintained.

**RESULTS**

**Part –A (Through Questionnaire)**

**Table – 1 :** Distribution of the respondent by their opinion whether they think production of Community Health Workforce (CHW) is essential for Bangladesh

Opinion of the respondent about production of Community Health Workforce (CHW) HW is essential for Bangladesh	Frequency	
	Yes (%)	No (%)
	44 (100)	0

Study revealed that all the respondents (100%) are in favour of production of CHW in Bangladesh.

**Table – 2 :** Distribution of the respondent by their opinion regarding the time when they feel for training to produce CHW. n= 25

Opinion regarding the time when training to be imparted to produce CHW.	Frequency	(%)
Pre service education (Before job through formal academic institutes)	35	61.4
In service training (Just after recruitment)	14	24.6
In service training (Within job/ during service time)	9	15.5

- Responses are more than 100% due to multiple response.

Table 2 shows the opinion regarding the time when the respondents feel for training to produce CHW through formal academic institutional or pre service education (61.4%) .

**Table –3:** Distribution of the respondent by their opinion

Opinion regarding different events for production of CHW in Bangladesh	Different levels of opinion					
	Strongly agree (SA)	Agree (A)	Undecided (U)	Disagree (D)	Strongly disagree (SD)	Total
	14 (31.8%)	12 (27.3%)	6 (13.6%)	9 (20.5%)	3 (6.8%)	44
	16 (36.4%)	14 (31.8%)	1 (2.3%)	10 (22.7%)	3 (6.8%)	44
	25 (56.8%)	7 (15.9%)	7 (15.9%)	2 (4.5%)	3 (6.8%)	44
	28 (63.6%)	16 (36.4%)	-	-	-	44
	7 (15.9%)	19 (43.2%)	5 (11.4%)	10 (22.7%)	3 (6.8%)	44

Table 3 shows that most of the respondents (56.8%) viewed that there are scopes of utilisation of produced CHW in rural areas and most of the respondents (63.6%) also viewed that terminal/marginalized/underprivileged/peoples of hard to reach areas at least can be served by CHW. Few of the respondents (43.2%) viewed positively about the competency of produced CHW.

**Table –4:** Distribution of the respondent by their opinion regarding sector which can produce CHW.

Opinion regarding sector which can produce CHW.	Different levels of opinion			
	Govt. sector	Non govt. sector	Both govt. & non govt. sector	Total
	5(11.4%)	1(2.3%)	38(86.4%)	44

Table –4. Most of the respondents (86.4%) viewed that both govt. & non govt. sectors should produce CHW with a very good co-ordination and co-operation .

**Table –5: SWOT Analysis in regards to the production of CHW in Bangladesh**

Strengths	Weaknesses	Opportunities	Threats
<ol style="list-style-type: none"> <li>1. Available personnel as trainees &amp; trainers.</li> <li>2. Enough Facilities are available in both sectors.</li> <li>3. MATS can also run CHW programmes.</li> <li>4. There are enough target population.</li> <li>5. Health infrastructures for CHW already exists at community clinics and in NGOs.</li> <li>6. There are 20 govt. approved institutes and 12 applied for permission.</li> <li>5. One year course for CHW is running at different institutes under DGHS &amp; SMF .</li> <li>6. Health facilities are up to grass root level where CHW can work.</li> <li>7. Existing good GO-NGO collaboration.</li> <li>8. Commitment of Govt. to provide health care services will help government to increase &amp; improve health indicators.</li> <li>9. At present about 905 personnel can be trained yearly by 20 training institute.</li> <li>10. Having enough manpower to be trained and also to run the CHW course.</li> </ol>	<ol style="list-style-type: none"> <li>1. Lack of manpower &amp; instruments.</li> <li>2. Lack of co-ordination among institutes, DGHS &amp; DGFP.</li> <li>3. Attitude of business rather than academic &amp; or social welfare.</li> <li>4. No standard uniform course curriculum.</li> <li>5. Poor teaching-learning or training.</li> <li>6. Services for target population are not well defined.</li> <li>7. Job descriptions for CHW is not nationally established and uniform.</li> <li>8. Less number of institutions, no definite guidelines.</li> <li>9. Lack of good planning of production &amp; utilization of CHW.</li> <li>10. Less institutes for production of CHW as per demand.</li> <li>11. No job guarantee for CHW.</li> </ol>	<ol style="list-style-type: none"> <li>1. There is a developed curriculum by SMF.</li> <li>2. The program can be coordinated easily by SMF, there are job opportunities, particularly in community clinics and urban slums.</li> <li>3. Opportunities for self employment are there.</li> <li>4. Need more production CHW in Bangladesh.</li> <li>5. Existing institutes and infrastructures present.</li> <li>6. The CHW producing training is institution based following uniform course curriculum of 1 year.</li> <li>7. Literacy rate is increasing &amp; a lot of educated both male &amp; female are coming forward to join this CHW course.</li> <li>8. Good GO-NGO collaboration.</li> <li>9. In many organizations man power can be utilized to train as CHW among rural population.</li> <li>10. Lots of scopes of primary health care, essential service packages &amp; family planning services by CHW.</li> <li>11. Having enough educated manpower for training</li> </ol>	<ol style="list-style-type: none"> <li>1. Heterogeneous way of production of CHW.</li> <li>2. Ongoing different programs will deteriorate the quality of services of CHW.</li> <li>3. If job opportunities are not ensured, future unrest may result .</li> <li>4. No standard uniform curriculum.</li> <li>5. Reduced quality of produced CHW.</li> <li>6. Conflict of interest will be raised between old staff &amp; new staff by designation .</li> <li>7. Problems of quality also in non govt. sectors .</li> <li>8. No structured guidelines, no job assurance, no future planning .</li> <li>9. Selection/ Recruitment variation of CHW.</li> <li>10. Institutional capacity development is not properly done.</li> <li>11. Non co-operation from concerned authority &amp; lack of positive attitude for establishment of the centre.</li> <li>12. If quality is not controlled &amp; government organization not involved in admission procedure, the programme will fail and people will not get good services.</li> </ol>

Table –5 shows, Distribution of Physical Facilities as per institutes shows that in half of the cases, the building is owned by the institutes, Total space of the Institute ranges from, 2000 to 6000 sq. feet mostly. Most of the institutes had class rooms, tutorial rooms, conference room, auditorium, Library, Audiovisual section and patients exposure facility.

In most of the institutes , the course curriculum offered is for community health worker (CHW) , diploma in one institute and basic training for family welfare visitor (FWV) in one institute. Minimum requirement for admission was SSC passed, average number of students / year / institute was 50-100 in all 16 institutes. Course duration is between 1-3 years, with permission and affiliation from DGHS/ MOH & FW.

Majority of the institutes had minimum teaching aids, such as-computer, multimedia, over head projector, slide projector, film projector, black board/white boards etc.

Distribution of library as per Institutes space 300-1200 sq. ft. seats about 50, total No of books 2000-7000 with availability of Journals.

Majority of the Institutes had manpower of average 10-15 per institute. Only NIPORT, Dhaka had 34 doctors and 22 nurses. Institutes of Chittagong, Sylhet, Pabna, Rajbari, Gazipur and Dhaka had formal assessment system.

## DISCUSSION

“Public health’ is the organised response by society to protect and promote health, and to prevent illness, injury and disability. The workforce involved in this enterprise ranges from those who identify as public health professionals to those who may undertake aspects of public health functions in the course of their health or other related work.

Public health functions occur at a number of levels. Commonwealth, State and Territory governments are primarily concerned with the setting of public health policy, determining broad resource allocation and providing an appropriate regulatory framework. Governments need to be informed by population based research and surveillance systems. Current demand for public health skills reflects the diversity of related issues and the public health workforce, as well as the better understanding of the comprehensive range of competencies required to deliver appropriate and evidence-based services. There is a need for an improved focus for investment in public health resources which has the capacity to respond to public health priorities, recognises a greater range of opportunities for effective education and training, having regard in particular for workforce locus of employment, location and need for flexibility, and seeks out partnerships.

More specifically, there are workforce implications flowing from the Partnership Group's Work Program including research and development, information development, harmonisation of public health regulatory frameworks and stronger national monitoring and surveillance systems<sup>6</sup>.

In united states, the Bureau of Labor Statistics projected that between 2000 and 2010, the work force they need is in shortage and accordingly the capacity building was planned.

Rural health care facilities include a wide variety of services along the continuum of care: nursing home, assisted living, home health, hospital, clinic, oral health, mental/behavior health, emergency, and pharmacy.<sup>1</sup>

Recent trends make clear that the struggle to find employment is widespread and that people at the low-wage and less educated end of the employment spectrum face an increasingly uphill battle to find jobs that pay adequately. As the growth of the economy has slowed, job growth is concentrated in positions requiring skills that are hard to find among the unemployed.

Bangladesh has managed to develop nation wide network of medical colleges, nursing and paramedical institutes. As per DGHS Health Bulletin 2009, there are 59 Medical colleges (41 of them are private), 13 nursing colleges (7 of them are private), 69 nursing institute (22 of them are private), 17 medical assistant training schools (10 of them are private), and 16 institute of health technology (13 of them are private). In spite of this growth to health workforce production, Bangladesh is still having health workforce shortage and skill mix & geographical imbalances. The World Health Report 2006 identified Bangladesh among 57 countries with critical shortage of doctors, nurses and midwives (Compared to WHO identified threshold of 2.28 doctors, nurses & midwives per 1000 population, Bangladesh has 0.56 per 1000 population). The Nurses: Doctors' ratio is below 1:1, which is among the lowest group in the world.

Repeated assessments have shown that there are major quality gaps in the teaching learning process and environment in health workforce education institutes. The recent growth of the non-government health professionals' education sector has increased the need of having functioning health professionals' regulatory bodies, which can work closely with the related government agencies to ensure the quality of education and practice. There is no recognized body to ensure the quality of public health education and accredit the related courses.<sup>3</sup>

Over 80% of Bangladeshi's turn to non-state providers as a first port of call when they fall ill. These health care providers include traditional healers, traditional birth attendants, village doctors, drug stores and NGO trained community

health workers. Bangladesh Health Watch have discovered that there are only 5 physicians and 2 nurses per 10,000 of the population as opposed to 12 village doctors and 11 drug sellers. Community members often value informal providers as they only charge for the drugs, not the consultation. They also offer flexible payment schemes.

The report looks at the strengths and weaknesses of providers and offers suggestions for where improvements can be made. It is not uncritical of the quality of health service that is often supplied by informal providers but it argues that this is a reason that they should be trained and managed effectively. They conclude that the quality of care - across the board in the public and private sectors - needs improvement. Currently, unqualified providers give drugs and advice but rarely rely on laboratory testing or refer appropriately to the formal sector. This leads to problems related to the inefficient and improper prescribing of drugs which can lead to continuing ill health and impoverishment.<sup>4</sup>

Bangladesh is identified as one of the countries with severe health worker shortages. However, there is a lack of comprehensive data on human resources for health (HRH) in the formal and informal sectors in Bangladesh. This data is essential for developing an HRH policy and plan to meet the changing health needs of the population. This paper attempts to fill in this knowledge gap by using data from a nationally representative sample survey conducted in 2007.<sup>5</sup>

The shortage of qualified health workers, especially in low-income countries, has drawn attention in recent times, as it seriously threatens the attainment of the millennium development goals (MDGs).<sup>6</sup>

## LIMITATIONS

Due to PRL, transfer of the previous DD (MA) /programme manager and also due to in absence of regular posting of the DD (MA) the work could not be done using the allocated time. So time constraints was a important factor also to complete the work due to developed situation.

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#### **Editorial Comments:**

*Public health workforce development is a serious issue. Here idea is to deal with populations and not individuals. It also absorbs significant national resources. Here a genuine effort has been made to assess the relevance and effectiveness of such a program in Bangladesh. Needless to say many such well designed research papers and auditing will be required before any firm conclusion can be put forward. This is an eye opening article.*



## Case Report

# “Phantom pain at the site of extracted teeth”

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### Key words:

phantom pain  
oro-facial  
reassurance  
counselling

### ABSTRACT

Patients who have undergone excision of a body part often experience a sense of awareness of the missing part called the phantom phenomenon. It is quite uncommon in oro-facial region. A case of phantom pain in oro-facial region has been found recently. A 71 year old male patient complains of aching type of pain in the region of extracted teeth. The pain caused him psychological fear whether he is having malignancy thus he is seeking medical advice. Pain is not much bothersome requiring drugs to relieve it. He is examined and investigated thoroughly; reassured and counselled properly.

### INTRODUCTION

Oro-facial region is the most common site of pain with diverse origin. Source of pain is frequently obvious and can be easily diagnosed and treated well but sometimes source of pain is not distinct, pain is vague thus diagnosis is difficult and treatment is not upto level of satisfaction of patients. Example for this is atypical facial pain. There are several modalities of atypical facial pain like atypical odontalgia, phantom pain at site of extracted teeth, neuralgic pain due to neuroma, trigeminal neuralgia, pain in orofacial region without known cause in depressive and menopause women etc.

Patients who have undergone excision of a body part often experience a sense of awareness of the missing part called the phantom phenomenon.<sup>1</sup>

Phantom pain at the site of extracted teeth is a kind of atypical facial pain where person complains of pain in teeth which

already get extracted. A case of phantom pain has been reported in community wellbeing dental care centre, Masbar, Pokhara.

### CASE REPORT

An old male person aged 71 years came to community wellbeing dental care centre with complaint of pain in teeth in right lower posterior region. Pain was mild to moderate. It was continuous aching type. It was not aggravated by hot and cold foods. When his mind was occupied with work, he did not use to feel pain but noticed pain when he was at rest.

Intraoral examination showed there was loss of all right lower posterior teeth. There was no swelling and gingival mucosa appeared normal.

An IOPA- dental x-ray was advised to check for any root stumps. There was not any root stump and any bone pathology seen on x-ray. The past history revealed that the extraction of teeth were uneventful. They were all very mobile and could be easily extracted. He was not replacing the missing teeth with dental prosthesis.

Medical examination showed he was hypertensive and diabetic but under control with medications. There was no pathological changes in oral mucosa due to his medical condition. Since

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the pain was within limit of tolerance, he was not taking any painkillers to relieve the pain.

The pain was bothersome when he was not at any work and his mind was not occupied. Pain was not disturbing his sleep. During sleep also he did not feel pain. Psychologically he was very stressful with that pain because he was afraid of cancer. He feared that whether he was having the cancerous pain. Thus he was seeking medical advice and came to community wellbeing dental care centre at Masbar, Pokhara.

## TREATMENT

The dental x-ray did not reveal any pathological changes in that region and pain did not seem quite bothersome so the patient was not seeking drugs to relieve the pain.

A diagnosis of phantom pain has been made and patient has been reassured that he is not requiring any further treatment as he was having normal condition. He had been convinced that he was not suffering from any sort of malignancy and pain was not due to cancer (malignancy).

He was further counselled that pain did not exist in real sense. He was having an illusion of pain in that region called as phantom pain.

If pain was quite bothersome for the patient, a tricyclic antidepressant (aminotriptyline) could be prescribed but patient did not seem bothersome with the pain thus no medication was prescribed. As he was seeking to rule out the cancerous pain he had been counselled properly that he was not having any sign of cancer.

## DISCUSSION

Disaesthesia is defective sensation like burning stabbing or burrowing type or a phantom pain meaning there by experiencing the same pain that was there prior to the treatment eg. Pain of pulpitis after tooth extraction or pain in tongue after glossectomy. Phantom pain is also a disaesthesia.<sup>2</sup>

Phantom pain is uncommon in oro-facial region. Rarely do we encounter the problem in our dental profession. This is the first report in this dental care center in span of 9 years. But in cases of limb amputation, in which the phantom phenomenon is best known, the phantom are painful in approximately 30% of cases and persist for more than one year in 10%.<sup>3</sup>

Before diagnosing the phantom pain, first of all we should carry out thorough examination and investigation and analyze the finding. If the examination finding and investigation report don't detect the abnormality in surrounding areas of pain and patient feels pain in lost part of body then only phantom pain can be diagnosed.

Paroxysms of phantom pain are of approximately 10 minutes durations and are described as stabbing, with extreme itching or deep burning and of pressure of the missing part. They may be triggered by tactile stimulation and usually are relieved by local anesthetic block of the peripheral nerve stumps. Although little is known of the incidence and pathogenesis of phantom pain

in the maxillofacial region, it should be given consideration in the differential diagnosis of facial pain and not dismissed as evidence of a psychological disorder.<sup>4</sup>

Although neuromas occurring at the regenerated nerve stump surface may contribute to phantoms, it appears that the primary site of pain mechanisms is in the brain stem.<sup>5</sup>

After limb amputation, about half the associated neurons die, and the regenerated fibers of the stump are usually small, poorly myelinated: and slow conducting. Stimulation of these stump tissues therefore may have the effects of activating an imbalanced gate control mechanisms in the brain stem and caused inappropriate sensory phenomena such as phantom pain.

Palpation and diagnostic block may reveal the presence of a contributing neuroma, and reamputation of nerves at more proximal levels may be successful in these cases. Carbamazepine therapy results in varying degrees of success and supportive care and reassurance is often adequate in less severe cases because phantom pain seems to diminish with time.

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Case Report

# Hypertension hypokalemia syndrome

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## Key words:

Primary hyperaldosteronism  
Adrenal adenoma  
Secondary hypertension  
Hypokalemia.

## ABSTRACT

Primary hyperaldosteronism or Conn's syndrome is due to excess release of aldosterone from adrenal glands and classically manifests as resistant hypertension and hypokalemia. More than 90% cases are attributable to aldosterone-producing adrenal adenoma and bilateral adrenal hyperplasia. Though previously thought to be an uncommon condition, with the use of widespread screening, it is now believed to be an important cause of secondary hypertension accounting about 10% of all patients with hypertension. Here we present two patients who presented with refractory hypertension and were successfully treated surgically.

## INTRODUCTION

Primary hyperaldosteronism is due to unregulated release of excess aldosterone from one or both adrenal glands. It is classically manifested as resistant hypertension, hypokalemia, increased aldosterone production and decreased renin secretion. Jerome Conn, in 1955,<sup>1</sup> first described primary aldosteronism (PA) as hypertension with hypokalemia due to an aldosterone-producing adrenal adenoma. The etiology is usually attributable to an aldosterone-producing adrenocortical adenoma or bilateral adrenal hyperplasia (idiopathic hyperaldosteronism), but can rarely be caused by a unilateral adrenal hyperplasia and glucocorticoid-remediable hyperaldosteronism.<sup>2</sup>

Primary aldosteronism, or Conn's syndrome was previously thought to be an uncommon condition, accounting for less than 1% of patients with hypertension.<sup>3</sup> However, with the use of

widespread screening, it is believed to account for 5% to 13% of all hypertension.<sup>4</sup> The ratio of plasma aldosterone concentration to plasma renin activity (PAC: PRA) is widely used as a first step in evaluating patients with both hypertension and hypokalemia. Although hypertension, hypokalemia and metabolic alkalosis are classic findings of primary aldosteronism, hypokalemia is seen in only 20% to 50% of documented cases.<sup>5</sup> Ninety percent of primary hyperaldosteronism cases are due to aldosterone producing adenoma or idiopathic hyperaldosteronism. Each has a distinct therapy; adenoma responds well to surgical excision, but idiopathic hyperaldosteronism requires life-long medical therapy. We present two cases of functional adrenal adenoma, presented as hypertension and hypokalemia and were successfully treated with surgical resection.

## CASE REPORT 1

25 years lady from eastern Nepal presented with headache and gradual swelling of whole body for one month. She also had associated nausea and vomiting and developed blurring of vision for last one week. She was G2P1+0 with 22 weeks period of gestation. Her last delivery was 4 years back and

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was normal vaginal delivery. There was no significant past and personal history. Physical examination showed ill patient with pedal edema, mild icterus, regular pulse with normal volume and high blood pressure, 250/130 mmHg. Per abdomen finding was ascites with 20<sup>th</sup> week uterus; but absent fetal heart sound. Thus the diagnosis of second trimester pregnancy with severe pre-eclampsia with missed abortion was made. The pregnancy was terminated by using misoprostol 200 ug. She was kept in CCU and antihypertensive drugs were started in combinations like clonidine, terazocine, spironolacatone, nifedipine, frusemide etc but there was no response. She was investigated; there was persistent hypokalemia with K<sup>+</sup> as low as 1.7 mEq/L. There was mild renal impairment with serum creatinine 160umol/L and 4(+) albumin with multiple RBCs in routine urine examination. Complete blood count including platelet, liver function test and bleeding profile were normal. There was persistent high BP which was not responding to all possible drug combination. Fundoscopy was performed for blurring of vision, which showed bilateral papilloedema but, the CT scan head was normal. She was evaluated in the line of secondary hypertension. Ultrasound revealed no abdominal mass except mild ascites and bulky post-abortion uterus. Serum cortisol level was 126 ng/ml (Normal; morning: 68-233 ng/ml; evening: 15-119 ng/ml) and 24 hour urinary VMA was found to be 17.34 mg/24 hours (normal <13.6 mg/24hour). However, plasma aldosterone concentration (PAC) and plasma rennin activity (PRA) could not be done due to technical problems. Thyroid function test (TFT) showed hypothyroid picture (T3- 1.0 pg/ml; N=1.2-4.2 pg/ml; T4- 10.2 pg/ml, N=7.2-17.2 pg/ml; TSH->55 µUnit/ml; N= 0.6-4.5 µUnit/ml) for which thyroxin 100µg daily was started. CT-scan abdomen revealed round to oval enhancing lesion in supero-antero-medial aspect of upper pole of left kidney with central non-enhancing area within space-occupying left adrenal mass likely pheochromocytoma. So the diagnosis of secondary hypertension due to functioning left adrenal tumor with the possibility of either Conn's syndrome or pheochromocytoma was made. Operation was planned and she underwent left open adrenalectomy which revealed a 2.5×3 cm tumor in upper pole of adrenal gland, yellowish brown cut section and free from the surroundings. Hypertension and hypokalemia persisted till 4<sup>th</sup> post-operative day which then gradually normalized with antihypertensive drugs. Otherwise, post-operative period was uneventful. She was discharged on 15<sup>th</sup> post-operative day with antihypertensive drugs (amlodipine, spironolacatone, prazosin,) and thyroid hormone substitution. Histopathology report localized adrenal cortical adenoma without capsular or vascular invasion. At one month follow up her BP was under control with 2 antihypertensive drugs.

## CASE REPORT 2

42 years lady from Kathmandu was found to have hypertension

during her visit to ophthalmologist for conjunctivitis. Her blood pressure was not decreasing with multiple drugs including amlodipine, losartan, and prazocine. Her past and personal history was not significant. Clinically no abnormality was detected except high blood pressure of 230/120 mmHg. She was evaluated for cause of hypertension. Routine hematological investigations were normal except slightly lower serum potassium level; 2.8 to 3.1 mEq/L. Serum cortisol was 8.05µg/dl (N- morning: 68-233 ng/ml; evening: 15-119 ng/ml), plasma aldosterone 164.6 ng/dl (N-3-16 ng/dl ), plasma renin 10.57 ng/ml (1.0 to 9.0 ng/mL/h), 24 hour urinary VMA was 9.2 mg/24h (normal <13.6 mg/24hour). The Plasma aldosterone concentration to plasma renin activity (PAC: PRA) ratio was 104.8. CCET abdomen showed small left adrenal mass probably functioning adrenal adenoma and large complex right adnexal mass s/o demoid cyst. (Fig 1) CT renal angiography didn't reveal any evidence of renal artery stenosis. Echocardiography revealed dilated LV, thickened IVS & LV posterior wall with EF 73%.

Thus a diagnosis of left adrenal functioning tumor was made. Open left adrenalectomy was performed. There was a 1.5cm × 1.5 cm, localized, solid tumor arising from adrenal gland with yellow cut section. (Fig 2) Intra operative and post operative period was uneventful. The blood pressure was controlled with antihypertensive drugs and the serum potassium level gradually became normal. She was discharged on 4<sup>th</sup> post- operative day. Histopathology report was suggestive of adrenocortical adenoma. At one year follow up the BP was under control with two antihypertensive drugs.

## DISCUSSION

Primary hyperaldosteronism has been regarded as a common cause of secondary hypertension. The common causes of hypertension with hypokalemia are diuretic use in essential hypertension, primary aldosteronism, Cushing's syndrome, pheochromocytoma, renovascular disease, malignant hypertension etc.<sup>5</sup> The commonest one is diuretic use in a hypertensive patient. Both thiazide and loop diuretics promote renal potassium secretion by enhancing urinary flow and sodium delivery through the collecting tubule. Hypokalemia may also result from gastrointestinal problems, such as diarrhea or vomiting, though these patients are generally not hypertensive. Magnesium deficiency due to malabsorption or poor dietary intake, and exposure to medications such as aminoglycosides are other causes of persistent hypokalemia. Spontaneous hypokalemia, in the absence of diuretic use, deserves further evaluation.

An initial approach for patients with hypokalemia and hypertension is to do the tests for most common causes of this syndrome. Random PAC: PRA ratio & serum aldosterone level are the initial tests for primary aldosteronism. A 24-hour

urinary fractionated metanephrines or plasma fractionated free metanephrines and a 24-hour urinary free cortisol or an overnight low-dose dexamethasone-suppression test are the screening tests for pheochromocytoma and Cushing's syndrome, respectively.<sup>6,7</sup> Although renal arteriography remains the diagnostic gold standard for renovascular disease, magnetic resonance angiography and computed tomography (CT) angiography have shown promising results in visualizing the renal arterial diseases. Although renal arteriography remains the diagnostic gold standard for renovascular disease, magnetic resonance angiography and computed tomography (CT) angiography have shown promising results in visualizing the renal arterial diseases.

Although hypokalemia and metabolic alkalosis are classic findings of primary aldosteronism, hypokalemia is seen in only in half of documented cases. Aldosterone producing adrenal adenoma (60%) and idiopathic hyperaldosteronism (35%) accounts majority of cases. Other rare causes include aldosterone producing adrenal carcinoma, <1%; familial hyperaldosteronism, <2% (Type I: glucocorticoid remediable aldosteronism, type II: non- glucocorticoid remediable aldosteronism); primary adrenal hyperplasia, <2%.<sup>8</sup>

The goal of diagnostic testing is to identify and lateralize aldosteronomas. The ratio of plasma aldosterone concentration to plasma renin activity (PAC: PRA) is widely used as a first step in evaluating patients with both hypertension and hypokalemia. If the morning PAC: PRA is >30, with PRA expressed as ng/mL per hour, and the PAC is >15 ng/dL, the results are highly suggestive of primary aldosteronism.<sup>9</sup>

If the morning PAC: PRA ratio is high then, confirmatory biochemical test is performed with aldosterone suppression test.<sup>10,11</sup> In normal patients, sodium loading suppresses aldosterone, but aldosterone remains elevated in patients with hyperaldosteronism. This is done with IV saline loading (2-3 L of isotonic saline given over a 4- to 6-hour period, followed by measurement of plasma aldosterone) or oral salt loading (200 mEq=5000 mg sodium daily over a 3-day period, followed by measurement of 24-hour urine aldosterone excretion). Plasma aldosterone >5-10 ng/dl after IV saline loading and 24-hour urine aldosterone excretion >12ug/day after oral salt loading is regarded as diagnostic. Localisation of the pathology can be performed with anatomical imaging like CT scan, selective venous sampling and sometimes functional scanning. Since most adenomas are smaller than 15mm in their maximum dimension, a thin – cut (3mm) adrenal CT scan is the preferred initial localisation test.<sup>12</sup>

Aldosterone producing adenoma has been recognized as second only to renovascular disease as the most common cause of surgically correctable hypertension. Primary

aldosteronism can present as severe hypertension and develop hypertensive emergencies.<sup>13</sup> The classical serum biochemistry is mild hypernatraemia, marked hypokalaemia, mild metabolic alkalosis (loss of hydrogen ions in exchange for sodium in the distal tubules) and an elevated fasting glucose. Plasma aldosterone concentration will be elevated and renin suppressed. The urinary biochemistry demonstrates elevated potassium (0.40 mEq/24 hours) and depressed sodium. Urinary aldosterone is raised and specific gravity lowered.<sup>14</sup>

Patients with primary hyperaldosteronism must be made both normotensive and normokalaemic prior to operative treatment in order to minimize perioperative morbidity and mortality. Usually a combination of drugs including spironolactone is required. The hypertension only responds to agents that reduce plasma volume.<sup>15</sup> Aldosterone producing adenomas are eminently treatable by surgery. Contraindications to adrenal surgery would be bilateral adrenal hyperplasia, bilateral adrenal adenomas requiring bilateral adrenalectomy, glucocorticoid remediable hyperaldosteronism, and those who are a poor anaesthetic risk because of concomitant medical disease. With the advent of laparoscopic adrenalectomy it may be the case that poor candidates for an open procedure may now be offered minimally invasive surgery.

In conclusion, primary hyperaldosteronism is a rare but important cause of hypertension. It should obviously be suspected in patients with hypertension and hypokalemia, resistant hypertension, and hypertension associated with adrenal masses. In aldosterone producing adrenal adenoma, surgical removal of the tumor is the appropriate treatment which leads to either cure or at least good control of blood pressure with fewer antihypertensive drugs.

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CME

# The Young Patient with Claudication

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## Objectives:

1. Define and justify early aggressive approach in young patient with claudication.
2. Tabulate the etiology for claudication.
3. List 8/11 points for PTA.
4. List 5/8 points for cystic advential disease.
5. Discuss bypass under inflow, outflow and conduit.

### 2.A.2.1: Why is the younger pt important?

Anyone with intermittent claudication should be fully evaluated, more so the young patient as we may find an easily treatable lesion and the long term outlook can be if risk factors are recognized and treated.

The most common age for presenting with claudication is 55-60 where AS is the most common cause. So we define a young claudicant as anyone < 50 years.

Usually conservative approach is appropriate for an old claudicant. Do not smoke, exercise, diet control. Intervention will be needed for only 25% of claudicants. In younger patient symptoms will more dramatically affect lifestyle, unusual diagnoses will assume greater importance thus more aggressive investigation should be encouraged.

Overall 5 year mortality for intermittent claudication is 30%. It's very easy to miss symptoms in a 20 year old.

- Popliteal entrapment.
- Cystic adventitial disease.
- Development anomalies.
- Venous claudication – Bursting sensation after walking, pain better after raising leg and Hx DVT or trauma.
- AS is common under 50 specially among smokers. AS as the principal cause of claudication in young pt should lead to search for other risk factors. In younger pt it has a more aggressive progress. Angina/MI and TIA/Stroke must not

be forgotten in addition to threat of loss of limb.

Pulses bruits and signs of peripheral ischemia should be actively looked for. Aneurysms in abdomen and popliteal fossa should be actively looked for. Cardiovascular and orthopedic systems should be carefully examined.

## Etiology for claudication:

- Atherosclerosis.
- Thromboembolism.
- Buerger's disease.
- Arteritis:
  1. SLE.
  2. Takayasu's ds.
- Fibrosis:
  1. Retroperitoneal.
  2. Radiation.
- Developmental:
  1. Coarctation.
  2. Persistent sciatic artery.
  3. Popliteal entrapment.
- Trauma.
- Cystic adventitial ds.

## POPLITEAL ANEURYSM:

1. Atherosclerosis:

10% of AAA will have popliteal aneurysm. Clinical, Doppler and angio. Bypass grafting.
2. Entrapment.

Abnormal origin of the medial head of gastrocnemius.

Pulses will disappear on full extension of the leg and plantar/dorsi flexion of foot. Thrombus will develop in post stenotic aneurysm. Scan both legs, this is b/l. Divide aberrant muscle bundle and bypass if occluded.

### 3. Marfan's syndrome.

Unusually tall. Arachnodactyly. High arched palate. Dislocated lenses. Chief presentation will not be claudication.

### 4. Ehler Danlos Syndrome:

Hyper extensible joints and hyper elastic skin. Mycotic aneurysms do not present with claudication, but with fever malaise and local pain.

### DEVELOPMENT ANOMALIES:

Coarctation may present with b/l claudication but usually with HTN.

Persistent sciatic artery is a rare cause for intermittent claudication in young. Diagnosis will be only by arteriography. Clinically popliteal and pedal pulses are absent.

### CYSTIC ADVENTITIAL DISEASE:

1. Uncommon condition of unknown etiology.
2. Lumen of popliteal artery is compressed by cyst developing in tunica media ~ ganglion.
3. Abrupt onset of claudication.
4. Scimitar sign on angio.
5. Doppler is probably the best investigation.
6. Angioplasty useless.
7. Excision with vein grafting.
8. Percutaneous puncture under CT control.

### TRAUMA:

- Usually the presentation is acute needing urgent revascularization.
- Claudication will be seen after recovery from fracture causing intimal damage.
- ABPI and pulse after exercise is required.
- Usually reconstructive surgery will be needed.

### ARTERITIS:

- Any pt with arteritis and claudication will have other symptoms.
- Buerger's ds: 30-40 male, heavy smoker, advanced peripheral ischemia, early distal ulcer and gangrene.
- Associated thrombophlebitis.
- Systemic cond<sup>n</sup> as SLE, Scleroderma and rheumatoid arteritis.

### • Takayasu

1. Is uncommon.
2. Originally described in young oriental women. Occurs in European races.
3. Aortic arch vessels principally affected but aortoiliac segment also can be involved.
4. Unusual distribution of arterial stenoses and occlusion in young with high ESR.
5. Steroids stop smoking.
6. 10 YSR without surgery is 90%.

### OTHER RARE CAUSES:

- Retroperitoneal fibrosis can be drug induced, idiopathic or malignant granulomatous induced.
- Aortoiliac stenosis.
- Surgery rewarding.
- Radiation will present only after 50 due to long lag phase.

### WORK UP:

- Ankle pressure is the best test.
- Remember to take ABPI after exercise.
- No fall in ABPI after exercise rules out significant arterial ds.
- Evaluation is becoming less invasive.
- Angio is needed for therapeutic rather than diagnostic purpose. A good indication is Lehigh synd. Here endovascular procedures are very useful.
- Exercise stress ECG and CXR are important.
- Aortoiliac occlusion is less amenable to conservative than SFA.
- Full blood count, ESR, Urea and electrolytes, Urine r/e, GRBS, Lipid profile.
- Tests for arteritis:
  1. ANA.
  2. DNA binding.
  3. RA factor.
  4. IG ANCA, SL70, cold agglutinin, cryoglobulin conc<sup>n</sup>.

If hx suggests embolization Echo cardio.

- Primary thrombosis antithrombin III, protein C, Protein S deficiency.
- Homocystineuria.

## MANAGEMENT

- Stop smoking, exercise, change diet.
- Tough control of BP and lipids are more useful in younger pt.
- None of the drugs claiming effect through increasing blood flow or metabolism are any use.
- Endovascular procedures are mainstay.
- If technically not amenable for endovascular procedures then formal surgery.

## PERCUTANEOUS TRANSLUMINAL ANGIOPLASTY

1. 1964 Dotter and Judkins.
2. Gruntzig' double lumen catheters 1976 made it popular.
3. There is no place for direct referral from physician to interventionist bypassing the vascular surgeon.
4. Stretching of the artery splits the intima, cracks atheromatous plaques, ruptures the media causing local dissection and sub intimal hage. Healing occurs by fibrosis, giant cell reaction and neointimal formation. Smooth lumen in few weeks.
5. Stenoses of aorta, iliac, femoral, popliteal, subclavian arteries, coronary, mesenteric and carotids.
6. Graft and AVF stenoses.
7. Short occlusions of fempop more amenable than iliac occlusions.
8. Antiplatelets must be prescribed after angioplasty.
9. Morbidity 5-15%. Most common hematoma t puncture site.
10. 2-3% thrombosis and distal embolization.
11. Vascular perforation and pseudo aneurysm are rare.

## RESULTS OF PTA:

- Aortoiliac:
  1. Best result with focal iliac stenoses.
  2. Stenosis affects orifice of another vessel more care is needed.
  3. Aortic bifurcation will need care to prevent damage to other side.
  4. IIA stenoses causing impotence show good results.
  5. Iliac occlusions are least suitable for angioplasty.
  6. Initial 96% success and 5YPR at 90%.
- SFA.

1. Best if stenosis is focal and < 2 cm.
2. Overall initial success is 85% and is much better for stenosis than occlusions.
3. 5 YPR 70% stenosis and 55 % for occlusion.

- Popliteal.

1. Results will be nearly same as for SFA but complications less forgiving.

Very difficult to compare endovascular procedures with surgery. As it is reserved for less severe ds and primarily fails in 15%.

Surgery reserved for more diffuse disease.

Advantages of EVP is short stay and low cost. It complements and does not replace surgery.

Other adjuncts are:

- Fibrinolysis.
- Laser assisted angioplasty.
- Atheroma cutters.
- Stents.

## BYPASS:

Inflow.

Outflow.

Conduit.

## OBJECTIVES REVIEWED:

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The Journal of GMC Nepal has a worldwide website at: <http://www.gmc.edu.np>

This issue of the Journal of the GMC Nepal is

Designed by:

**Shashi Neupane**

Printed at :

**Munal Offset Printers**, Mahendrapul, Pokhara, Nepal.

Nepal. Tel. +977-61-523555, 531700;

Fax : +977-61-532444.

