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Insulin initiation in Type 2 Diabetes

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The Role of Antibiotics in the Treatment of General Pediatric Conditions: An Observational Study From a Tertiary Care Centre, India

Sharon Ann Georgy*, Lakshmi R*, Remya Sudevan**

ABSTRACT

The extensively prescribed therapeutic agents in paediatric age group for treating general conditions are antibiotics. The use of antibiotics has become a routine practice for the treatment of pediatric illness. The judicious use of antibiotics has definite role in treating children. The irrational use of antibiotic use has lead to bacterial resistance globally and exists as a major public health issue. The most significant target population aimed at reducing antibiotic resistance are children. So there exists the need to evaluate the role of antibiotics in children with general pediatric conditions. Our study was aimed to identify the major therapeutic issues in antibiotic usage among pediatric population.

Key Words: Pediatrics, antibiotics, antimicrobial resistance.

INTRODUCTION

Antimicrobial agents or antibiotics are substances produced by various species of microorganisms (bacteria, fungi, actinomycetes) that suppress or inhibit the growth of other microorganisms and may eventually destroy them1. Various antibiotics act in different ways to destroy the pathogens. Antibiotics like penicillins and cephalosporins inhibits cell wall synthesis whereas tetracyclines, macrolides and clindamycin inhibits the protein synthesis. Agents like sulphonamides and trimethoprim blocks the important metabolic steps of the microorganisms. Metronidazole and quinolones interfere with nucleic acid synthesis2. In childhood majority of the children suffer from variety of bacterial infections such as respiratory tract infections, sinusitis, otitis media, pharyngitis, urinary tract infections etc. Antibiotics are the most commonly prescribed therapeutic agents in pediatric patients for the treatment of these bacterial infections3,4. Studies have shown that in antibiotic usage by age, preschool children were more exposed to antibiotics due to their entry in community setting5. Some studies had reported that Pencillin group of drugs were the commonly used first line drugs in children everywhere6-8. Recently there is a global shift in prescribing antibacterial agents towards not first line agents such as second generation macrolides, cephalosporins etc9,10,11. There exists geographical differences in antibiotic usage depending on the existing health care systems, physician attitude, sociocultural and economic determinants of parents. Antibiotic resistance is a major public health issue globally due to the prolongation of patient suffering, increased health care expenses and the economic implications for community5. Three important ways of antimicrobial resistance are enzyme degradation of antibacterial drugs, alteration of bacterial proteins that are antimicrobial targets and changes in the membrane permeability to antibiotics12. The key factors for bacterial resistance are overuse and misuse of antibiotics. Antibiotics are prescribed incorrectly, used in conditions in which they are not indicated and also in sub-optimal amount13. More over there are potential adverse drug reactions existing for antibiotic use. Adverse drug reaction (ADR) is defined as a response to a drug which is noxious and unintended and which occurs at doses normally used in man for prophylaxis, diagnosis or therapy of disease or for modification of physiological function13.

To improve the antibiotic prescribing pattern and appropriate use of antibiotics in children for common conditions, evidence based studies are needed from our country. To reduce the unnecessary antibiotic use we have to identify the conditions in which antibiotics are over prescribed. Our study aimed in evaluating the role of antibiotic use in children.

OBJECTIVES

Primary objective
To assess the role of antibiotics for the treatment of general conditions in pediatric population.

Secondary objectives
1. To identify the common conditions in which antibiotics are prescribed for children.
2. To identify the most commonly used antibiotic for general conditions in pediatric population.
3. To document adverse drug reactions when antibiotics are administered.
4. To determine the duration of hospital stay in pediatric population with general conditions where antibiotics are used.
METHODOLOGY
This is a prospective observational study. The study was carried out at the general ward of pediatrics department in a tertiary care centre. A total of 200 patients in the age group of >1 month -18 years who were admitted in the general ward for general conditions during the time period of July 2013 – May 2014 were enrolled in the study. The study duration was 11 months. A standardised data collection form was used for collecting data from the patient’s case files. The data collected were compiled using Microsoft Excel. All statistical analyses were carried out using IBM Statistical Package for Social Science(SPSS version 20). To obtain the characteristics of categorical variables, frequency and percentage were used and that of numerical variables mean and standard deviation were applied.

Inclusion Criteria
• All pediatric inpatients of age >1 month to 18 years who were admitted in the pediatric ward for general conditions.
• Pediatric patients who were prescribed with antibiotics.

Exclusion Criteria
• Patients admitted in NICU or any other wards.
• Patients who were immunocompromised or who were diagnosed with TB.

RESULTS
The mean age of the patients in this study was 4.21 ± 4.61 years with a minimum of 2 months and maximum 17 years. The maximum number of patients ie, 65(32.5%) were in the age group of 1-3 years and 39(19.5%) were in the age group of <1 year of age. Only 2 patients were in the age group 16-18 years. The age distribution of patients is shown in Figure1. The maximum number of patients ie, 65(32.5%) were in the age group of 1-3 years and 39(19.5%) were in the age group of <1 year of age. Only 2 patients were in the age group 16-18 years. The male to female ratio of the study patients was 1.47:1. All the 200 study patients were immunized as per the age.

Almost 3/4th of the patients who were included in this study were staying in rural area ie, 143(71.5%) and only 57(28.5%) were staying in urban area. The common conditions in which antibiotics were prescribed were Lower respiratory tract infections (LRTI) (32%), asthma exacerbation (17%), Upper respiratory tract infections (URTI-10%), Urinary tract infection (UTI) - 8% and Gastroenteritis (GE)-3.5%. The distribution of cases are represented in Table 1.

During the study period, 2 adverse drug reactions (ADRs) were observed due to the antibiotic therapy. They were skin rashes with injection Cefotaxime and rashes with itching for injection piperacillin/tazobactam(Piptaz). The causality was assessed using Naranjo scale which was categorized to be ‘possible’ in both the cases.

The mean number of days of hospital stay was 9.04±4.64. Majority of the patients (55.5%) stayed for 6-10 days and 0.5% stayed for more than 30 days. Longest hospitalization was seen for pneumonia.

CONCLUSION
From this study it can be concluded that children below 5 years of age were more prone to infections. Majority of the children infected were male. All the patients were immunized as per age and 71.5% were from rural area. Respiratory infections especially lower respiratory tract infections were the most common condition that required antibiotic prescription. The frequently prescribed antibiotics were ceftriaxone and amoxicillin with clavulanic acid. The mean duration of hospitalization was found to be 9.04 ± 4.64 days. As antibiotics share a very high percentage in any prescription, periodic study on the usage of antibiotics and sensitivity pattern in the hospital set up is needed. These studies will enable the health care professionals to select the appropriate antibiotic which helps in promoting the rational use of antibiotics as well as preventing antibiotic resistance in children.

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Insulin Initiation And Titration Patterns In Type 2 Diabetes Mellitus

Revathi K Rajan*, Mohammed Ashraf*, Harish Kumar*

ABSTRACT

Aim: The aim of the study was to understand the doses and types of insulin used to initiate insulin therapy in Type 2 diabetes patients and study the effect of insulin initiation on glycemic control and body weight.

Methods: A prospective study was performed using data from the healthcare management suite. Data on patient characteristics, metabolic and clinical outcomes were collected at baseline and during 3 months follow-up.

Results: In total 150 eligible adults [103 males, 47 female; mean age 55.59 ± 11.782 years; mean baseline HbA1c 10.33 ±1.57%] were initiated on insulin. Approximately half (59.3%) were initiated on premixed insulin twice daily, 30% on basal insulin, 4.0% on bolus twice and premixed, 4.0% on one basal and 3 bolus, 1.3% on 3 bolus, 1.3% on 2 bolus. Only 9.3% had mild hypoglycemic reactions. Mean Fasting glucose was decreased to 130.3mg/dl from 222.5mg/dl; mean Post prandial blood glucose was decreased to 209.8 mg/dl from 331.6mg/dl. Baseline HbA1c was decreased to 8.67% from 10.33%. Patients had a mean weight gain of 1.75kg and an increase of 0.928 in Body mass index (BMI).

Conclusion: Premixed insulin was the most commonly used insulin for initiation. Initiation of insulin therapy has shown a significant decrease in HbA1c (2.07%), and a modest weight gain with a lower incidence of hypoglycemia. The baseline HbA1c of 10.74% at initiation of insulin suggests that clinicians were waiting too long to initiate insulin in their clinical practice.

Corresponding Author: Harish Kumar

INTRODUCTION

Diabetes Mellitus is a global problem with high social, health and economic consequences and the number of people affected is steadily increasing. Thus, not all patients suffering from the disease can be treated by specialized outpatient clinics, and the majority is treated by primary care physicians. The latter, however, might have time constraints and have to deal with many kinds of diseases or patients with multiple morbidities, so their focus is not so much on lowering high blood glucose values. Thus, the physicians, as well as the patients themselves, are often reluctant to initiate and adjust insulin therapy, although basal insulin therapy is considered the appropriate strategy after oral anti diabetic drug failure, according to the latest international guidelines. Insulin therapy is recommended for patients with Type 2 Diabetes Mellitus and an initial HbA1C level greater than 9 percent, or if diabetes is uncontrolled despite optimal oral glycemic therapy.

Despite the many clinical benefits of insulin therapy for patients with Type 2 Diabetes, many patients and physicians are reluctant to initiate insulin treatment, even if it is clearly indicated to achieve optimal glycemic control. Barriers for insulin initiation includes patient’s misconceptions regarding insulin therapy, injection phobia, hypoglycemia concerns, negative impact on social life and job and limited insulin self management training. Physicians are concerned about possible side effects and have limited time for patient education. These barriers lead to delay in initiation of insulin therapy in Type 2 Diabetes patients and thereby increasing their exposure to hyperglycemia.

The clinical guidelines suggest once daily basal regimen for initiation, but many physicians consider initiating other insulin regimens based on the clinical situation of the patients. Insulin regimens should be tailored to the patient’s needs and lifestyle. One of the most important considerations is the pharmacokinetics of different insulin preparations. Titration of insulin is critical in improving glycemic control and preventing diabetes related complications.

This study was conducted to understand the insulin initiation and titration in type 2 diabetes and understand the effect of insulin therapy on these patients. This study looked at the initial HbA1C, fasting and post prandial blood glucose, initiated insulin regimen, effect on weight and incidence of hypoglycemia.

RESEARCH DESIGN AND METHOD

This is a prospective study of type 2 Diabetic patients who came to our department of Endocrinology and Diabetes at Amrita Institute of Medical Science during a time period of February 2015 to July 2015. We have selected patients with type 2 diabetes with uncontrolled blood glucose who were newly initiated on insulin.

Inclusion criteria for the study are Type 2 Diabetes Mellitus with uncontrolled blood glucose and newly initiated on insulin.

Exclusion criteria for the study are Type 1 Diabetes Mellitus, Gestational Diabetes Mellitus and patients already on insulin.

For the preparation of questionnaire certain literature related to insulin initiation and titration, various types of insulin, management of insulin therapy etc, were reviewed. The search was performed using English word which as same as above words. In the study we have selected 150 patients who came to our department of Endocrinology at Amrita Institute of Medical Sciences. The patients were interviewed individually and all the data was collected based on the questionnaire. Patients were...
RESULTS

In total 150 eligible adults [103 males, 47 female; mean age 55.59 ± 11.782 years; mean baseline HbA1c 10.33 ±1.57%] were initiated on Insulin. Approximately half (59.3%) initiated insulin as premixed insulin twice daily, 30% as basal insulin, 4.0% as bolus twice and premixed, 4.0% as one basal and 3 bolus, 1.3% as 3 bolus, 1.3% as 2 bolus. At the time of initiation on insulin 87.3% patients were previously on diet and Oral hypoglycemic agents, 5.3% were on diet control alone, 4.7% were newly diagnosed and 2.7% were not on any therapy (fig:1). Hypertension was present in 40.7% and Dyslipidemia in 40%. When we asked about the duration of diabetes we found that 11.3% were newly diagnosed, 12% had less than 5yrs of duration, 38% with 5 to 10 years of duration, 29.3% with 11 to 20 years of duration, and 9.3% with duration of more than 20 years. The baseline mean fasting glucose was 222.5 mg/dl and mean post prandial glucose was 331.6 mg/dl and mean HbA1c level was 10.33%. Follow-up data at 3 months after initiation of insulin showed significant decrease of glucose values. Mean Fasting glucose was decreased to 130.3 mg/dl, mean post prandial glucose decreased to 209.8 mg/dl and mean HbA1c was decreased to 8.67 % after 3 months. The mean initial dose of insulin was 19.96 units which was titrated up to a mean of 25.36 units at the end of 3 months. Mild hypoglycemia was reported by 9.3%. There were no reports of severe hypoglycemia. This study population showed weight gain after the initiation of insulin therapy which could be caused due to the effect of insulin on body. Patients had a mean weight gain of 1.75kg after initiating insulin and an increase of 0.928 in BMI.

The most common insulin initiation regimen was premixed insulin twice daily (59.3%), and then was basal insulin (30%). Other regimens included were bolus twice and premixed (4.0%), one basal and 3 bolus (4.0%), 3 bolus (1.3%) and 2 bolus daily (1.3%) (Fig: 2). The most common delivery device was found to be Vial and syringe (59%), followed by temporary pen (28%), and permanent pen (13%)(Fig:3).

DISCUSSION

insulin should be added either as the first agent when clinically indicated or when A1C is not at goal on one to two oral hypoglycemic agents. Physicians, patients, and health care teams should carefully consider and overcome any psychological barriers to initiation and work closely together to prescribe a physiological regimen to
control fasting and postprandial blood glucose levels. Presently two of the most common approaches in initiating insulin are basal or premixed insulin regimens. In our study more than half the patients were initiated on Premixed insulin while basal insulin was the less preferred regime. Use of analogue insulin was also less frequent. This is in contrast to reports from Iran1 and Australia2 where basal insulin Glargin was the preferred starting insulin. However a study comparing intensive mixture insulin with basal insulin as the start up insulin in Type 2 Diabetes showed that target glycemic levels could be achieved with both regimes9. Premixed insulin has a high patient acceptability however disadvantages include a more rigid regimen and a slightly higher degree of glycemic variability and hypoglycemia10.

The baseline HbA1c of the patients in our study was 10.3% at the time that insulin therapy was initiated. There may be a number of reasons for this. Since our hospital is a tertiary care center many patients with uncontrolled Diabetes are referred very late and present with very high HbA1c values. However, this very high baseline HbA1c reflects the fact that clinicians have been waiting too long and delaying insulin initiation. A large population based study from UK11 also reported that primary care physicians delay insulin initiation. After 3 months of insulin therapy the patients in our study showed a good HbA1c reduction of 2.07% showing that this treatment strategy is effective in this clinical context.

The two common side effects of insulin therapy are hypoglycemia and weight gain. Both patients and the treating physicians are wary and concerned when using insulin therapy. We had a low incidence of reported hypoglycemia as the insulin doses were titrated very gradually, the mean increase in insulin doses from baseline to 3 months was only 5.4 units. There were no reported severe hypoglycemic episodes. This data is reassuring that insulin treatment when added on to oral hypoglycemic agents in this manner in Type 2 Diabetes is safe. This is particularly relevant as fear of hypoglycemia is one of the main barriers against initiation of insulin therapy8. Our study reported a mean weight gain of 1.75 kilograms over 3 months after insulin initiation, which is an expected occurrence with insulin therapy.

Complex insulin regimens at the time of initiation of insulin therapy may confuse and dishearten the patients. Another important barrier for insulin initiation in patients with Type 2 diabetes is starting with multiple daily injections of different types of insulin12. Often it is more manageable for patients and physicians to begin with a once-daily basal insulin or premixed regime instead of rapid acting insulin to be taken before meals for nutrient coverage along with a long acting basal analogue.

CONCLUSION

Insulin was effective and safe when added on to oral hypoglycemic agents in Type 2 Diabetes. It markedly improved glycemic control with low rates of hypoglycemia and some weight gain. Premixed insulin was the preferred insulin for initiation in our center. The high baseline HbA1c suggests that clinicians are waiting too long and delaying insulin initiation in Type 2 Diabetes.

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Risk Factors of Fall among Elderly Persons: Results from a Community based Case-Control Study in Thiruvananthapuram, Kerala, India


ABSTRACT
Aim: Proportion of elderly is rapidly increasing all over the world including in India. The realm of falls and injuries among this group is neglected due to various factors especially in the Low and Middle Income Countries (LMICs). This study is aimed at identifying the risk factors for fall among elderly persons residing in an urban area of Kerala.

Methods: A community based cross sectional study was conducted among 82 elderly people, aged 60 and above residing in an urban area of Thiruvananthapuram during January 2017. The cases were those who had sustained a fall in the past one year; controls, who had not sustained a fall in the same period. A semi structured questionnaire was used to obtain the details regarding various exposure variables.

Results: Mean (SD) age of the cases and controls were 75.05(7.93) and 70.60(6.95) respectively. Mean age and BMI were found to be higher among cases than controls. Presence of heart disease (p=0.02) and having slippery floor (p=0.035) were found to be significant predictors of fall among elderly. Diseases like Diabetes mellitus and hypertension were also found to be higher among the cases. Even though locomotor problems were more among cases, the presence of visual impairment and poly pharmacy were comparable between the two groups.

Conclusion: Prevention of cardiovascular diseases and provision of an elderly- friendly environment play a major role in prevention of falls in elderly individuals.

Key Words: Elderly, Fall, Case control study

Corresponding Author: T S Anish

INTRODUCTION
The proportion of individuals aged above 60 years is growing at a rapid rate globally due to the advancing life expectancy and improving standards of living. By 2050, this section of the population is projected to grow to almost two billion. This increasing number is posing newer concerns with regards to their health. Along with the increased occurrence of diseases with advancing age, falls and fall related injuries are posing grave challenges with regards to their health. Around the world, approximately 28-35% of people aged of 65 and over fall each year increasing to 32-42% for those over 70 years of age. The average health system cost per one fall injury episode for people 65 year and older in Finland and Australia was found to be US$ 3611 and US$ 1049 respectively.

The problems associated with health among elderly are several of which falls constitute a major problem. The Global Burden of Falls among elderly constitute 1.36% of the total DALYs. In India, more than 8% of the total population is constituted by individuals aged above 60 years.

There are several risk factors for falls in elderly. These include increasing age, female gender, physical frailty, unsteady gait and balance, impaired cognition etc. The risk of falling increases with a higher disease burden from chronic conditions such as cardiovascular disease, diabetes and visual impairment. Home hazards, such as slippery floors and poor lighting, and features of the public environment, such as poor building design and uneven sidewalks, increase the risk of falls in older adults. Interventions were found to be very useful in preventing and decreasing the morbidity associated with fall in elderly.

Prevention of falls is not given a high policy priority in many developing countries because of the lack of awareness about the problem and its burden. Elderly individuals constitute a sizeable proportion of the population in Kerala. As per Census 2011, 12.6% of the population is aged above 60 years.

It was found that falls among elderly were mostly as a result of intrinsic factors and fall related injuries that were found to be a major cause of their hospitalization in Kerala. Strategies for reducing the frequency of this common cause of morbidity and mortality are needed. Effective preventive strategies require a better understanding of the causes and risk factors for fall among elderly persons. This study was undertaken to identify the risk factors for falls in past one year among elderly persons residing in an urban area of Thiruvananthapuram, Kerala.
METHODOLOGY

The data for the current study was collected as a part of workshop on epidemiology organized by the Department of Community Medicine, Government Medical College, Thiruvananthapuram for postgraduate students from various medical colleges of Kerala, India during the month of January 2017. Training was given for tool development and a semi structured questionnaire was prepared by the participants themselves and modified by the facilitators. A case control study was conducted among elderly population, aged 60 and above residing in the Gandhipuram area under Medical College Health Unit at Pangappara, inside Thiruvananthapuram City Corporation. There is always a debate on the cut off age to call the older segment of population elderly. United Nations has agreed to use the cutoff of 60 years, especially for the third world countries, even though 65 years is the cutoff for most of the western studies.

We have used a cutoff of 60 years in the current study as it would increase the proportion of source population. Elderly people who had sustained a fall in the last one year were recruited as cases. Controls were the elderly population who had not sustained a fall in the past year. Those who had severe cognitive impairment were excluded from the study. Hence fall was operationally modified as an event which results in the person coming to rest inadvertently on the ground or other lower level and other than as a consequence of the following: sustaining a violent blow, loss of consciousness, sudden onset of paralysis or an epileptic seizure.

Information on socio-demographic variables, medical history, anthropometry, known risk factors of fall like slippery floor, visual/cognitive/locomotor impairment, co-morbidities, substance use, exercise were elicited from the study participants. A comprehensive semi structured questionnaire was prepared as a part of the workshop with inputs from several experts/clinicians in the field of health and epidemiology.

After finalizing the tool and a detailed training, the group was divided into pairs. Each pair visited the consecutive houses and those coming under eligibility criteria were identified. The examiners explained the details about study and informed written consent was obtained. Interview schedule was conducted to collect the required data. Quantitative parameters like height and weight were noted as reported by the participants.

Data collected were entered into Microsoft Excel and was analyzed using SPSS Trial version 16. Categorical variables were expressed as frequencies and proportion and Quantitative variables were expressed as means and standard deviation. Chi square test and independent sample t test were used to find out the association between fall and selected variables. Multivariable analysis was done Binary Logistic regression to find the predictors of fall. Backward LR method was included.

RESULTS

The total number of study participants was 82, with 22 cases (who had a reported history of fall within one year of the time of survey) and 60 controls (without a perceived history of fall). The cases had equal proportions (n=11) of males and females, while the control group had 55% (n=33) males and 45% (n=27) females (Table 1). All of the study participants were elderly (above 60 years). The mean(SD) age of the cases was 75.05(7.93) years, greater than the controls, who had a mean age of 70.60 (6.95) years (Table 2). The socioeconomic status was comparable in both the groups with 86.4% (n=19) of the cases and 86.7% (n=52) of the controls belonging to the APL category. The mean (SD) BMI in the cases was 24.16(1.98) kg/m2 while it was 23.90(3.69) kg/m2 in the control group.

Bivariable analysis was done on variables like slippery floor, elderly friendly house, visual impairment, locomotor problems, diabetes status, dementia, heart diseases, hypertensive status, usage of footwear inside house, polypharmacy, alcohol use, regular exercise and overweight (all dichotomous in character) with history of fall as the outcome variable (Table 2). Slippery floor (P = 0.047), diabetes (P = 0.019) and heart disease (P = 0.024)

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<th>Variable</th>
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Table 1: Sociodemographic characteristics (original)
came out to be statistically significant risk factors for fall, whereas elderly friendly house (P = 0.023) was protective. The cases had higher proportion of visual impairment, loco motor problems, dementia, hypertension, polypharmacy, alcoholism and were overweight than that of controls, but did not turn out to be significant. Usage of footwear inside the house and exercise had a lower proportion in cases than in controls, which was also not significant.

Multiple logistic regression with backward stepwise method was used to get prediction models. Model 1 was able to predict the probability of outcome with 15.9% variability whereas model 2 could do the same with 11.6% variability. The three additional variables
in model 1 were able to bring an increase in R2 by only 0.043. So model 2, with only two exposure factors, slippery floor at home (Adjusted OR 3.35) and presence of heart disease (Adjusted OR 4.69) was taken as the final multi-variate model to find out the independent predictors of fall among elderly (Table 3).

**DISCUSSION**

The mean (SD) age of the individuals with fall was 75.05(7.93) years which was higher than those who did not fall 70.60(6.95).

Advancing age has been found to be having an association with increased frequency of falls. It can be due to the presence of multiple factors associated with aging. Studies have also documented increased occurrence of fall among females. Similarly, lower socio economic status has en found to be a risk factor in Indian scenario.

Our study has not looked into such associations, but has found them to be distributed in similar proportions.

Presence of heart disease and having slippery floor were found to be significant predictors of fall in this study after multivariable analysis. Both have been found to be important risk factors for fall among elderly in the past.

The mean BMI was marginally higher for cases than controls. Studies done in foreign settings found higher rates of fall among elderly who are overweight.

Increased weight is usually associated with other conditions like poor physical performance, decreased activities of daily living (ADL), cardiovascular diseases (CVD) and imbalances.

Hence, along with the conventional cardiovascular morbidities associated with increased BMI, increased risk of falls also pose an important challenge in elderly with higher BMI.

Also, sarcopenia is a common finding among elderly which in itself can prolong hospitalization following fall, leading to increased morbidity and mortality.

For combating all these challenges, improving physical activity may hold the key. Even though regular exercise was not found to have significant association with falls in the present study, the role exercise plays in lowering BMI, decreasing CVD, improving muscle mass and countless other benefits points to the need to widen the scope of elderly-friendly physical activity. Regular exercise will improve the muscle tone and help increase the flexibility and balanced movements. Recent evidence from a large meta analytic study also points to significant role physical activity can make in the lives of elderly.

Slippery nature of the floor also has come out as significant risk factor for occurrence of fall among elderly. Slippery floors could be due to presence of water, cloth, polythene bags etc on the floor as seen previously.

Lack of awareness regarding the measures to be adopted for preventing slipping will be the greatest obstacle in tackling this. Evidence of lower grip strength in those who fall should make us look for means to tackle the challenges posed by slippery floors.

Physical inability together with an environmental stressor like a slippery floor will more likely result in fall among aged.

Poor vision, lowered reflexes and muscle strength associated with old age cannot be corrected beyond a certain extent with advancing age. Tailored education programmes with house floor plans, usage of non-slip socks etc should be looked into for helping with the daily locomotive problems of elderly.

Designing optimal footwear for older population should also be considered. The findings of MOBILIZE Boston Study also had similar findings.

In any place where an aged person lives it should be ideally free from hazards like unsafe furniture, unsafe mats, slippery items on the floor etc. Presence of rails in the bathrooms and slopes, good lighting, safe supports etc will help the aged to move around steadily. Falls-HIT trial which specifically addressed home modification showed a significant reduction in falls.

Polypharmacy and alcoholism were proportionately higher among those who fell but were found to have no significant association with falls in this study. Medications like oral hypoglycemics, antihypertensives etc can cause dizziness and precipitate fall. Supervised medications and alcohol restriction will help elderly in avoiding preventable falls. Even though comorbidities like hypertension, locomotor problems, visual impairment, and dementia are more among cases, they were found to have no significant association.

Studies have shown that a previous history of fall itself is a risk factor for future falls.

Hence, improved researches in this realm are the need of the hour to advocate control measures for prevention of falls among elderly. Prevention of cardiovascular diseases by improving physical activity together with building an elderly friendly environment are the measures that we suggest in tackling this ever increasing challenge.

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To Assess Anxiety and Depression in Patients Undergoing Maintenance Haemodialysis in a Tertiary Care Hospital in Kerala

Arya Jith*, K Sreekumar*, Chitra Venkateswaran*

ABSTRACT

Background: Chronic Kidney Disease has been increasing worldwide, so is the number of patients undergoing maintenance haemodialysis. They have a higher prevalence of psychiatric co morbidities like depression and anxiety. However these problems remain undiagnosed and under treated. This study aim was to assess anxiety and depression in patients undergoing maintenance haemodialysis and also to assess the socio demographic variables.

Method: This cross-sectional study enrolled 110 patients >18 years on maintenance haemodialysis. Their symptoms was assessed using Hospital Anxiety Depression Scale (HADS) and other psychiatric co morbidities was assessed using M.I.N.I International Neuropsychiatric interview. Socio demographic data was also collected.

Results: Of 110 subjects 61.8 % had depressive symptoms and 54.5 % had anxiety symptoms. Depression and anxiety was significantly associated with abnormal BMI. In multivariate logistic regression depression was statistically associated with female sex(OR=5 and with 95% CI ) and during the initial phase of haemodialysis (OR =2.5 with 95% CI) It was also found that suicidality was associated with depressive and anxiety symptoms.

Conclusion: Depression and anxiety symptoms are common in patients undergoing Haemodialysis. They are all the cause of increase in suicidality in these patients. It was also found that female sex and patients who had lesser number of haemodialysis sessions had more depression and anxiety symptoms.

Keywords: Depression, anxiety, haemodialysis

INTRODUCTION

Chronic Kidney Disease has been increasing worldwide due to growing prevalence of diabetes and Hypertension worldwide. Depression and Anxiety are common psychiatric problems in patients with End Stage Renal Disease. Approximately 20-25% of patients suffering from chronic medical problems also experiences clinically significant psychological symptoms. Haemodialysis is a practical treatment for kidney failure and has increased survival rate of patients with Chronic Kidney Disease. But this method imposes restrictions in all dimensions of life. An average haemodialysis session takes approximately 3-5 hours and will occur 3 times per week. It will consume significant proportion of patients’ time.

Dialysis patients also have to adhere to controlled diet, limit fluid intake and follow a complex regime of medication. There are many dietary restrictions which include protein, potassium, sodium, calcium and phosphorous. As the patients survival rate also increased with better medical treatment, their depressive and anxiety symptoms increased over time. The incidence of anxiety is a common disorder in haemodialysis patients is 27-46%. Suicide may be the end result of depression. It was also found that depression was significantly correlated with low BMI. Depression have more common suicidal ideation and poorer quality of life.

Currently the relationship between depression, suicide and anxiety remains poorly understood. Objective of this study was to assess the symptoms of anxiety and depression in patients undergoing maintenance haemodialysis.

MATERIALS AND METHODS

Study Population

A hospital based cross sectional study was conducted in Haemodialysis Unit of Department of Nephrology, Amrita Institute of Medical Science, Kochi from the year August 2014- August 2016. The sample size was calculated based with a prevalence of 33.3 % reported in an urban population in Lucknow. The sample size was estimated to be 110 with 95% confidence interval and 20% allowable error. Patients who has underwent at least one haemodialysis and who is above the age of 18 years was enrolled in the study. Patients who were able to read and write English or Malayalam were included. Patient who already had a past history of psychiatric diagnosis was excluded from the study. Written informed consent was obtained from each patient before participation. This study was approved by the ethical and research committee of AIMS Kochi to use human subjects in the research study.

Procedures

In this cross sectional study all Haemodialysis pa-
Out of 110 subjects undergoing maintenance haemodialysis 60 had Anxiety (HADS score ≥ 8). Mean HADS -A score was 8.59 ± 3.61 and Mean HADS –A score of males was 8.69 ± 4.38. Mean HADS score of females was 12.63 ± 4.56. Out of 67 males 32 (47.8%) had depressive symptoms and out of 43 females 36 (83.7%) had depressive symptoms. There was statistically significant association between gender and depression (p value <0.001). Out of the 46 living in a nuclear family 22 (47.8%) had depressive symptoms. Out of the 20 subjects who were living in a joint family (65%) had depressive symptoms. All 8 subjects who were living alone had depressive symptoms. Out of 34 subjects who was living in other conditions (hostel, other relatives) 25 (69.4%) had depressive symptoms. There was a statistically significant association between type of family and depression (p value 0.007). Out of the 42 subjects who had income between Rs 10,000-Rs 20,000 per month 22 (88%) had depressive symptoms. Out of the 42 subjects who had income between Rs 20,000-Rs 40,000 per month 21 (50%) had depressive symptoms. Out of the 43 subjects who had family income of more than Rs 20000 per month, 25 (58%) had depressive symptoms. There was a statistically significant association between family income and depression (p value 0.007). Out of 19 subjects who had undergone haemodialysis of < 49 times 17 (89.5%) had depressive symptoms. Out of 16 subjects who had 50-99 number of haemodialysis 12 (75%) had depressive symptoms and 4 (25%). Out of the 75 subjects who had underwent >100 haemodialysis 39 (52%) had depressive symptoms. There was statistically significant association between depression and number of haemodialysis (p value <0.006). Out of 25 subjects who had BMI of <18.5 all 25 (100%) had depressive symptoms. Out of 70 subjects whose BMI is between 18.5-24.9, 33 (47.1%) had depressive symptoms. Out of 15 who had BMI 25, 10 (66.7%) had depressive symptoms. There was statistially significant association between depression and BMI (p value <0.001). Variables sex, Marital status type of family, number of haemodialysis and BMI were entered in a multivariate regression model and female sex (OR-4.98 with 95% confidence interval) and lower number of haemodialysis (OR—2.50 with 95% confidence interval) were statistically significant. The association of sociodemographic variables with depression is summarized in Table 2.
To Assess Anxiety and Depression in Patients Undergoing Maintenance Haemodialysis in a Tertiary Care Hospital in Kerala

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Table 1: Distribution of Sociodemographic Factors

![Bar chart showing distribution of various psychiatric comorbidities](Image)

**Fig 1 : Distribution of various psychiatric comorbidities- an over view**
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Table 2: Association of Socio demographic variables with Depression.
To Assess Anxiety and Depression in Patients Undergoing Maintenance Haemodialysis in a Tertiary Care Hospital in Kerala

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Table 3: Association of sociodemographic variables with anxiety
13 (81.2%) had anxiety symptoms. Out of 75 subjects who had undergone haemodialysis more than 100 times 35 (46.7%) had anxiety symptoms. There was statistically significant association between anxiety and number of haemodialysis (p value- 0.029). Out of 25 subjects who had BMI of <18.5 21 (84%) had anxiety symptoms . Out of the 70 subjects whose BMI was between 18.5-24 9 30 (42.9%) had anxiety symptoms. Out of 15 who had BMI ≥25 9 (60%) had anxiety symptoms. There was statistically significant association between BMI and anxiety (p value<0.002).

The association of sociodemographic variables with anxiety is summarized in Table 3. Compared with non anxious patients subjects with anxiety had a statistically significant association with gender, BMI and number of haemodialysis. Among multivariate logistic regression it was found that female sex OR-2.846 with 95 % confidence interval was statistically significant. In this study using M.I.N.I it was found that out of 110 subjects 6(5.5%) had mania, 6 (5.5%) had panic disorder, 3 (2.7%) had agoraphobia and 5(4.5%) had social phobia. OCD symptoms was found in 10 (9.1%) and Post traumatic stress disorder symptoms was found in 4 (3.6%) subjects. It was also found out of 110 subjects 3(2.7%) had features of alcohol dependence and 10 (9.1%) had features of abuse. It was also found that 13 (11.8%) subjects had features of abuse, and 3 (2.7%) had features of psychiatric symptoms. The frequency distribution of all other psychiatric co morbidity in patients undergoing maintenance haemodialysis using M.I.N.I is summarized in Figure 1. It was also found out that the prevalence of all other psychiatric co morbidity was lower when compared to Depression and Anxiety. In our study it was also found that out of the 38 subjects who had suicidality all were depressed. It was also found that out of the 38 subjects who had suicidality 73.7 % had anxiety.

DISCUSSION

This study was undertaken in the background evidence that prevalence of Chronic Kidney Disease and patients undergoing maintenance haemodialysis has been increasing worldwide. Though studies have been done in India to assess the depression in these patients, most of the studies haven’t looked into other psychiatric co morbidity in these subjects.

The WHO World Mental Health (WMH) surveys on the global burden of mental disorders, 2009, concluded that, the lifetime prevalence of mood disorders and anxiety disorders are approximately 12% and 16% respectively. In our study using Hospital Anxiety Depression Scale(HADS) 61.8 % had score of ≥8 in depressive subscale. In a similar study bone by Patel.e.al in Lucknow had 33.3 % had depressive symptoms. In another study by Chen et.al had 35 % had depressive symptoms. Mean HADS-D score was 10.23±4.83 (0-21) and mean age is 56.34±13.25. In another study by Zhang.et.al showed that prevalence of depression was 39.3%12. In another study the overall meta-analytic prevalence of depression was 22.8% in 249 individual study population and there was evidence of high level of heterogeneity. The report also showed that self report scales may overestimate the presence of depression. The prevalence of depression in our study is higher than that observed by most of the other studies. This variability may be due to sample size, heterogeneity in CKD severity between samples and differences in scales used to assess the depressive symptoms. The Chennai Urban Rural Epidemiology Study (Cures – 70) was the largest population-based study from India to report on prevalence of depression and showed that the prevalence of depression was 15.1%14. Thus the prevalence rates of depression in patients undergoing haemodialysis is higher than that reported in general population.

In the current study among sociodemographic factors including gender, marital status, education, type of family and income were taken into consideration. The factors which were significantly associated with depression were gender, type of family and family income. Out of the 67 males 47.8% had depressive symptoms and out of 43 females 83.7% had depressive symptoms. In the general population also generally women had higher chance of being diagnosed of Major Depressive disorder from adolescence to adulthood. Mean HADS –D score for males was 8.69±4.38(0-21) and females was 12.63±4.56. (0-21)

In this study it was also found that patients who were living alone were more depressed. The findings can be correlated with a similar study done by Fischer.et.al where it was found that patients who were Living alone had 43% depression in BDI(Becks Depression Inventory) scoring15. Another study done by Zalai.et.al found that the main factors which influenced the level of psychological distress are patients sociodemographic characteristics (eg. age, gender and family income) and social support. This might be due to the role changes within the marital dyad, family and community level.

In this study depressive symptoms had statistically significant association with BMI. Patients who were undernourished or overweight had more depressive symptoms. Thus there was an association between depression and BMI. In a study by Wit.et.al done in 43,534 individuals it was found that there was a U shaped
association between BMI and depression. It was also found that people with low BMI had more anxiety symptoms. But we should keep the fact that BMI may be affected by various other co-morbid medical problems, environmental and genetic factors.

In the current study it was found that patients who had lower number of haemodialysis were more depressed than others. The findings were similar to a study done by Watnick et al. in which 123 patients who was started on haemodialysis of which 44% patients scored ≥14 in BDI(Becks Depression Inventory). In multivariate logistic regression analysis, females were five times more depressed and subjects with lower number of haemodialysis was twice more depressed than other subjects in the study.

In our study using HADS(Hospital Anxiety Depression Scale) 54.5 % of the patients anxiety subscale ≥8 in anxiety subscale. Mean HADS - A score was - 8.59±3.77. It is similar to a study done by Chen et al. 21% had anxiety symptoms.

In another study done by Lee et al. showed that prevalence of anxiety in CKD is 27.6% and the prevalence did not differ across CKD stages. In a similar study done by Reckert et al. which was done in 2013 in 52 haemodialysis patients it was found that 17% had Generalized Anxiety Disorder using SCID(Structured Clinical Interview for DSM5) and 23 % scored ≥7 in HADS-A. High prevalence of anxiety symptoms can be explained by the fact that patient attending haemodialysis have significant apprehension about the prognosis of treatment, duration of haemodialysis and anxiety concerning the financial aspects of treatment. However these aspects were not methodologically studied. Hence further research focusing on the aspects of anxiety needs to be undertaken.

In the current study among sociodemographic factors including gender, marital status, education, type of family and income were taken into consideration. The factors which was significantly associated with anxiety was gender. Among 43 females who underwent haemodialysis 69.8 % patient scored ≥8 in HADS-Anxiety subscale and among 67 males 44.8% scored more than ≥8 in anxiety subscale. Mean HADS A score for females was 9.81±3.68 and for females was 9.81±3.68. This result does not correlate with the findings got by Lee et al. where there was no correlation between anxiety and sociodemographic variables. Mean age of patients with Anxiety was 55.77±14.23.In this study it was also found that patient who had lesser number of haemodialysis (≤100) had a significant association with anxiety. In a study done by Lew et al. to analyze psychosocial factors at the initiation of haemodialysis it was found that the lifestyle burden and losses associated with planning and initiation of haemodialysis account for these observations.

In this current study it was also found that patients with lower BMI(<18.5) scored ≥ 8 in the anxiety subscale of HADS-A and there was a statistically significant association (p value-0.002). Poor nutrition may occur due to loss of appetite. But abnormal BMI can also be attributed to Chronic Kidney Disease or other co-morbid illness. The findings were similar in a study done by Zhao et al. where patients who had abnormal BMI had more anxiety symptoms. In multivariate logistic regression anxiety symptoms was statistically associated with female subjects was three times more anxious than other subjects. In another study done by Livesley et al. it is stated it showed that anxiety is more common in females.

**Limitations**

As the design of the study was a cross sectional, we were unable to assess the changes in depressive or anxiety symptoms with disease progression. Secondly, though M.I.N.I and HADS has been validated for the use in patients with ESRD, it has not been validated against a gold standard psychiatric diagnosis of depression in patients with CKD. Thirdly, to meet the diagnosis, DSM-5 or ICD 10 diagnostic criteria was not used. To meet the diagnostic criteria for DSM-5, the subjects needs to fulfill the exclusion criteria as quoted in DSM 5 “The symptoms are not due to direct physiological effects of a medication/general medical condition;“ DSM 5 criteria may have a higher specificity but a lower sensitivity than HADS. Authors used HADS to define case of depressive disorder and anxiety disorder. Lastly subjects from this study were from a single hospital. It will be better if we recommend further research with sample from multiple hospitals.

**CONCLUSION**

It was found that anxiety and depression is the most common psychiatric co-morbidity in patients undergoing maintenance haemodialysis. It was also found that females had more anxiety and depressive symptoms. By using M.I.N.I it was found that other psychiatric co-morbidities prevalence rate was much lower. From this study it was also found that patients had more depressive and anxiety symptoms at the time of initiation of maintenance haemodialysis.BMI also had association with depressive and anxiety symptoms.

Depression and anxiety adversely affect the quality of life and survival of these patients. They are all treatable since patients undergoing maintenance haemodialysis are frequently seen by the doctor on a regular basis. Therefore there is no barrier in diagnosing or treating such conditions. So it is essential for the nephrologist to be aware of such symptoms in these patients. Timely treatment of such symptoms will reduce the disease.
progression, increases the survival rate, decreases the health care cost and increases the quality of life.

**Suggestions for future research**

A long-term follow up study should be conducted in order to find out more about the long-term impact of depression and anxiety in dialysis patients. Further treatment studies of depression/anxiety should be performed, and their effectiveness for symptom reduction should be evaluated. The etiology of depression is not known, so there are few studies that support a stress and inflammation hypothesis in depression in the general population. It would be interesting to further study the relationship between stress, inflammation and depression in dialysis patients. Further study of comorbid depression and anxiety, as well as their associations with the quality of life of dialysis patients, is needed. Controlled clinical studies to assess coping style, social support and physical training as effective interventions for depression and anxiety are needed.

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ABSTRACT

Background and methods: Cardiac arrest is the abrupt loss of heart function in a person who may or may not have a diagnosed heart disease due to the malfunction of the heart’s electrical system. The time and mode of death is usually unexpected. It occurs instantaneously or shortly after symptoms appear.

This prospective observational study was performed on 100 patients who suffered an In hospital cardiac arrest (IHCA) in a tertiary care hospital in south India, AIMS (Kochi).

Objective: The purpose was to identify the most common reversible cause of in-hospital cardiac arrest (IHCA) in adult patients, the most commonly affected population and the most common disease conditions associated with cardiac arrest and to investigate whether recognition of causes of arrest during the provision of ACLS resulted in improved survival.

Result: In all 100 episodes, the cause of In- Hospital Cardiac Arrest was reliably determined. Other conditions included sepsis, de-compensated liver failure and chronic kidney disease. The median values of Age group (59), total cycles of CPR (20), ETCO2 during CPR (18), ETCO2 at end of CPR (19), Adrenaline (4), shock (2) and RBS (192).

Conclusion: The major disease conditions associated with cardiac arrest were cardiac conditions (45%). Sepsis was found to be present in 23% of patients with IHCA. Among the causes within the 5H’s and 5T’s hypoxia dominated with 37%, followed by acidosis 23%. In the study we have found that the recognition of cause of arrest during the provision of ACLS resulted in improved survival.

Keywords: In- hospital cardiac arrest, advanced cardiac life support, cardiopulmonary resuscitation

INTRODUCTION

In hospital cardiac arrest (IHCA) is the ultimate complication to critical illness among hospitalized patients. If the triggering causes of arrest are recognized by the in hospital emergency team, this may have crucial consequences for survival.

Improvement of the cardiac arrest (CA) chain of survival (COS) has contributed to increased survival in many regions: early recognition of CA, immediate and good quality cardiopulmonary resuscitation (CPR), early defibrillation in case of pulseless and shockable cardiac arrhythmias, and proper care of immediate survivors. Further elements for improvement should be sought.

From the early days of modern resuscitation to the current guidelines for advanced cardiac life support (ACLS) and in hospital resuscitation, encouragement has been given to ‘recognize and treat’ and correct reversible causes during CPR. To what has not been thoroughly investigated while return to spontaneous circulation (ROSC) ought to be improved by recognizing and treating the underlying cause, survival to hospital discharge is likely to be less affected depending on additional factors such as co morbidities.

If cardiac arrest (CA) occurs in a hospitalized patient, the primary intervention is cardiopulmonary resuscitation (CPR) following the current advanced cardiac life support (ACLS) guidelines, which include a reminder of the causes of CA through the mnemonic 5H’s and 5T’s (hypoxia, hypovolemia, hypoa/ hyperkalemia, hypothermia, H+ ions, thrombosis pulmonary, thrombosis coronary, toxins, tamponade, tension pneumothorax). This study was conducted to investigate the reversible cause of IHCA with their respective survival rate.

METHODOLOGY

Inclusion Criteria:
Patients 18 years or above who had an in hospital cardiac arrest (IHCA).

Exclusion Criteria:
- Patients younger than 18 years of age
- Traumatic cardiac arrest
- Pregnancy
- Out of hospital cardiac arrest

Structure, material and location

This was a prospective observational study which was conducted from July 2017 to December 2017 at Amrita Institute of Medical Sciences (AIMS), Kochi. The details concerning patients, inclusion strategy and the thorough investigation of the IHCA causes were collected. The code blue team consists of one resident anaesthesiologist, one resident cardiologist and team leader of nurses and emergency medical technician (EMT). The EMT is set up to provide respiratory and circulatory sta-
RESULT

This prospective observational study included 100 patients who had in-hospital cardiac arrest (IHCA) who were selected from the Emergency Room, ICUs and wards of Amrita Institute of Medical Sciences and Research Centre from July 2017 to December 2017. Among 100 patients included in the study satisfying inclusion criteria, the episodes of IHCA, 94% (94) of cardiac arrest occurred in ICUs and remaining 6% (6) occurred in ward, because ICU patients were more critical. Amidst the 100 patients included in the study 32% (32) of patients needed 5-10 cycles of CPR, 21% (21) of patients needed 11-20 cycles of CPR and 26% (26) of patients needed 21-50 cycles of CPR and 21% of patients needed >50 cycles of CPR. In this study we have found that 80% (80) of patients were already intubated, 10% (10) were intubated during resuscitation and remaining 10% (10) were provided by Bag and Mask ventilation.

The ETCo2 values during CPR in 19% (19) patients were <10 mmHg and it was advised to improve the quality of CPR in those patients. 38% (38) had 11-20 mmHg, 35% (35) had 21-30 mmHg, and 8% (8) had >30 mmHg. ETCo2 at end of CPR were 44% (44) of patients had 0-10 mmHg, 10% (10) had 11-20 mmHg, 18% (18) had 21-30 mmHg, and 28% (28) >30 mmHg. ETCo2 values were <10 mmHg at the end of 20 minutes of CPR in dead patients. The initial rhythm in 46% (46) of patients was Pulseless Electrical Activity (PEA) 31% (31) had Asystole, 12% (12) had pulseless Ventricular Tachycardia (pVT), and 11% (11) had Ventricular Fibrillation (VF). And 77% (77) of patients had non shockable rhythm and remaining 23% had shockable rhythm.

During resuscitation Adrenaline was administered as 1mg/ml ampoule of 1:1000 dilution of and was repeated in every 3-5 minutes. Here 64% of patients had received 1-5 ampoules of Adrenaline, 28% had received 6-10 ampoules of Adrenaline and remaining 8% had received >10 ampoules of Adrenaline.

Data collection

All relevant clinical data were extracted from the patients’ records including age, sex, co morbidities, cause of arrest, surveillance, ETCo2 value, mode of ventilation, total cycles of CPR, number of Adrenaline given, number of shock, other illness, IV drugs given and RBS.

The primary variables of interest were: cause of arrest, suspected by the EMT; cause identified retrospectively by the authors; and whether the cause was recognized by the EMT.

Aetiology analysis

The causes of cardiac arrest were categorized as 5H’s and 5T’s, namely:
- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis pulmonary
- Thrombosis coronary

Statistical analysis

The data collected were compiled using Microsoft Excel. All statistical analyses carried out using IBM statistical Package for Social Science (SPSS version 20). We used frequency and percentage to present categorical variable and median to present numerical variable.

RESULT

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Fig 3: Graph showing distribution of causes of cardiac arrest.

Fig 4: Graph showing distribution of medicines used for reversible causes of cardiac arrest.
DISCUSSION

This is a prospective observational study done on 100 patients who had in hospital cardiac arrest. Among which, 78% were males and remaining 22% were females. The study was done to identify the most common cause of in hospital cardiac arrest. The age category was >18 years.

The findings in this study reveal that, among the 5 H and 5 T causes, the majority of IHCA’s were due to hypoxia 37% (37) and the condition for which they got admitted were cardiac in origin 45%. The prominence of different cardiac causes advocates the cardiologist to be immediately available in the post- ROSC period or to be a member of code blue team to ensure optimal follow up of cardiac conditions. A study conducted by Jones et al. demonstrated that among 37 doctors serving as ET physicians, 10 (27%) failed to recall the assumed most frequent causes of 5H’s and 5T’s, hypoxia and hypovolemia, and the overall frequent causes of 5H and 5T causes was low12. In addition, these authors did not report how closely they examined the episodes with regard to etiology. Here in this study the most common cause within the 5H’s and 5T’s were hypoxia (37%), H+ ions (23%) followed by hyperkalemia (17%).

This study demonstrates that the EMT was instrumental in recognizing the cause of arrest, i.e. in accordance with the finding of the etiology study group. In more than 90% episodes of cardiac arrest a reliable cardiac arrest cause could be determined by the EMT. An analogous consideration regarding the recognition of causes in 10% of all episodes remain unknown despite the close investigation and also were not able to decide whether the EMT’s made the correct consideration about the causes of arrest in these episodes.

A Finnish- Swedish study by Saarinen et al., including patients with in-hospital cardiac arrest between 2003 and 2010 demonstrated superior 30 days survival among resuscitated patients whose underlying causes were appropriately treated15. Whether appropriate treatment was based on the recognition of cause by the EMT’s was not reported in this study.

In the present study, PEA and asystole were the first documented rhythm in 77% of episodes, in which 46% was PEA and a percentage of 31 were found to be asystole. However, this is not very different from 71% of PEA and asystole in a study by D. Bergum et al. or 79% in the Get with the Guidelines Resuscitation registry study by Girora et al. with 84,625 hospitalized patients13,14. When the initial rhythm was PEA or asystole, the causes were not strictly non-cardiac and approximately half of all cardiac episodes presented with PEA or asystole as well.

In the current study, we found that the clinical conditions triggering IHCA becomes crucial for the choice of treatment. The appropriate timing, however, was not taken into account in this study. Cause specific treatment can be prepared and initiated immediately if ROSC is achieved. In certain cases of cardiac arrest, achieving ROSC may be fully dependent on a specific therapeutic measure, e.g. pericardiocentesis during cardiac tamponade or fluid resuscitation during shock.

Yet another study by, D. Bergum et al. stated that the median delay from arrest to chest compression was only 1 minute, which was relatively fast compared to other studies. It is reasonable to associate the relatively high survival rate in this study to the high proportion of observed IHCA’s and immediately initiated CPR because an association has been well demonstrated between early CPR and a high probability of ROSC. In this study we found that local ward nurses or physicians had initiated CPR in >90% episodes before the arrival of code blue team. Short intervals from collapse to CPR depend on immediate action by the local ward personnel, and they must be included in the hospital wide CPR or BLS training programme.

In this we have strengthened that the fact that ET CO2 value of <10mmHg even after 20 minutes of high quality CPR was associated with higher mortality, which has already been proven in many other studies. Most of the
patients included in the study were intubated already, and the episodes of cardiac arrest were high in the ICUs.

In this study we found out that the background disease condition to some extent can contribute in the recognition of cause of arrest: e.g. most of the sepsis patients had cardiac arrest due to H+ ion (acidosis).

An important question that arises is whether the recognition of causes during ACLS in IHCA influences short term or long term survival. “Rate of recognition” may be relevant to future CPR guidelines and more studies are needed to clarify the potential role of such measures.

A chief strength of this study is the prospective observational design and the thorough investigation of all episodes with respect to etiology and causes. However this study also has several limitations. A consequence of this method is that a large proportion of episodes were categorized as unknown with respect to their etiology and causes due to the lack of objective diagnostic findings. The sample size is too small to investigate every possible sub-group. This applies especially to the other components of 5H’s and 5T’s where they never became a cause of arrest.

The study is based on a single centre which limits the generalizability; however the patients and episode characteristics are in general comparable to what is being reported in international studies.

CONCLUSION

In conclusion, the majority of associated disease conditions with cardiac arrest were cardiac diseases 45% (45). Sepsis was found to be present in 23% (23) of patients with IHCA. Among the reversible causes within the 5H’s and 5T’s, hypoxia dominated with 37% (37), followed by acidosis 23% (23).

Most commonly affected age group was 45-73 years, and males were affected almost 3 times more than females. Maximum number of IHCA’s were observed in an ICU setting than ward because ICU patients were more critical. All the IHCA’s were witnessed.

In the study we have found that the recognition of cause of arrest during the provision of ACLS resulted in improved survival.

Cause – related survival was relatively high with the two largest groups- cardiac causes and sepsis. In patient who suffered an in hospital cardiac arrest, PEA was the first detected rhythm. No cause – specific ECG pattern was found during early phase of resuscitation, nor could survival be predicted based on the instantaneous ECG pattern defined in this study.

Early recognition of cause of cardiac arrest caused significant improvement in over-all survival of patient who suffered an IHCA.

REFERENCES


Effectiveness of Hepatitis-B Vaccination Programme Among Grade II Health Personnel of Government Medical College, Thiruvananthapuram

Lakshmi G G*, Zinia T Nujum**, Prathibha M T***

ABSTRACT

Background: Health care workers are at increased risk of contracting Hepatitis B infection. The most effective way to prevent the infection and its consequence in susceptible is an effective vaccination strategy. Not only a vaccination strategy but post vaccination serology is essential to track the responders and non responders. Hence this study is being conducted to assess the effectiveness of a vaccination programme meant for vaccinating health care workers by estimating the seroconversion rate for Hepatitis B vaccine.

Materials and methods: A Cross sectional study was conducted among Grade II health workers of Medical College, Thiruvananthapuram, who have been fully vaccinated under Hepatitis B vaccination programme held in January 2014. 75 study participants were recruited for the study following systematic random sampling. The study subjects were interviewed using a semi-structured questionnaire to collect the socio-demographic data and blood samples were collected to estimate Antibody titre during April 2015 to May 2015.

Results: Mean age of the study subjects was 44.12 years (SD 7.2). Majority of the study participants were females 61 (81.3%), rest were males 14 (18.7%). 14.66% had inadequate Anti Hepatitis B antibody titre <100 IU/L and 85.33% had adequate Anti Hepatitis B antibody titre ≥100 IU/L after three doses of vaccination. Bivariant analysis showed that temporary job status and presence of hypertension was associated with decreased antibody titre.

Conclusions: The Seroconversion rate in our study population is fairly good but post vaccination serology is not routinely practiced. This study showed insights on the need for pre placement Hepatitis B vaccination and subsequent follow up.

Key words: Effectiveness, Health care personnel, Hepatitis B, Antibody titre.

Corresponding Author: Prathibha M T

INTRODUCTION

Hepatitis B is incontrovertibly a major global health problem faced by mankind. The estimates that more than 2 billion people worldwide have been infected with HBV and approximately 780,000 persons die each year from infection makes the point obvious. The infection can run an acute or chronic course. The chronic infection puts people at high risk of death from cirrhosis and liver cancer and around 650,000 of such cases succumb to death every year whereas around 130,000 die from acute form of the disease.  

Hepatitis B prevalence is highest in sub-Saharan Africa and East Asia, where between 5–10% of the adult population is chronically infected. The prevalence of Hepatitis B prevalence in India ranges from ranges from 2 to 8%, in general population which places India in an intermediate HBV endemcity zone.

Among the groups of people who are at risk of developing hepatitis B, health care workers have well recognized occupational risk. The risk of contracting hepatitis B is four times greater than that of general population. In developed countries, HBV infections in health care workers were less than 10%, largely because of immunization and post-exposure prophylaxis. But in developing countries, HBV infections in healthcare workers are about 40-65% attributed to percutaneous occupational exposure.

In India, a tertiary care hospital in Delhi reported that 1% of healthcare workers were HBsAg positive.

The most effective way to prevent the infection and its consequence in susceptible is an effective vaccination strategy. The Advisory Committee on Immunization Practices recommends that Health care and public safety workers at risk for exposure to blood or blood-contaminated body fluids should also take the vaccination. They should also undergo post vaccination testing 1-2 months after the vaccination series.

In India, Hepatitis B vaccine is produced at the serum institute of India. GeneVac-B™ (Recombinant Hepatitis - B Vaccine, I.P.) is a non infectious recombinant DNA Hepatitis B Vaccine. Primary Immunisation – a series of three intramuscular injections at 0, 1, 6 months is required to achieve optimal protection. Vaccination is successful if the antibody-titre (anti-HBs) is higher than 100 IU/L. If the anti-HBs level remains lower than 10 IU/L, there is no protection against hepatitis B and revaccination is recommended. Seroconversion rate of the vaccine globally ranges from 85-90 %.

Of the umpteen number of diseases a health care worker is occupationally exposed to, hepatitis B is not only the most transmissible infection, but the only one that is preventable by vaccination.
Although seroprevalence in general population has been estimated in many studies, only a few studies have been done in health care workers- especially among health care workers handling hospital waste. The most important approach for the prevention of occupational HBV infection is the use of hepatitis B vaccine among HCWs at risk. Sadly in developing countries like India, there is no standardized post vaccination protocol to confirm, monitor and maintain immunity.

Most of the newly recruited grade II workers in Govt. Medical College, Thiruvananthapuram were not vaccinated against Hepatitis B. So a vaccination drive was initiated by the administrative authorities. Hence the following study is being conducted with an aim to assess the effectiveness of a vaccination programme meant for vaccinating health care workers b estimating the seroconversion rate for Hepatitis B vaccine and also to assess the various factors related to adequate Antibody titre.

MATERIALS AND METHODS

A Cross sectional study was conducted among Grade II health workers of Medical College, Thiruvananthapuram, who have been fully vaccinated under Hepatitis B vaccination programme held in January 2014. The study was carried out at Preventive Clinic under the department of Community Medicine Medical College, Thiruvananthapuram. The study subjects were interviewed and blood samples were collected after obtaining informed written consent. The study was conducted during the period April 2015 to May 2015. According to a study on “Evaluation of immune response to Hepatitis B vaccine in health care workers at a tertiary care hospital in Pakistan”, the prevalence of sero conversion was found to be 85%

Hence the sample size was calculated using the formulae for prevalence studies and it came out to be 75. Out of the total 300 grade 2 health workers vaccinated from preventive clinic under the programme, every third person was recruited by systematic random sampling into the study till the final sample size of 75 was met. Among those health care workers fully vaccinated under this initiative, 75 workers were selected using systematic sampling from the register and was administered a semi structured questionnaire. Following this, the selected study subjects underwent blood testing to estimate the Anti-HBs antibody titre in Accredited Clinical Research Laboratory, Medical College, Thiruvananthapuram. The Anti-HBs kit used for assay is ARCHITECT Anti-HBs, a Chemiluminescent Microparticle Immunoassay (CMIA) which determines the concentration of antibody to Hepatitis-B surface antigen (anti-HBs) in human serum and plasma.

Data was entered into Microsoft Excel and analyzed using appropriate statistical software. The categorical variables are expressed in proportions and the quantitative variables are expressed with relevant measures of central tendency and dispersion. To find the factors associated with seroconversion, analysis was done using chi-square test for qualitative variables and t-test for quantitative variables after checking for normality.

An ethical clearance from the Human Ethics Committee, Medical College, Thiruvananthapuram, prior to the initiation of the study was obtained. The results of blood tests were communicated to the study subjects. Those who did not have protective antibody titres were advised to take Hepatitis B vaccine booster dose and to check antibody titre after one month.

RESULTS

The study included 75 grade II health professionals of Government Medical College, Thiruvananthapuram. The results are described under following subheadings:

1 Socio demographic profile

Mean age of the study subjects was 44.12 years (SD7.2 ), minimum age was 24 and maximum age was 59. Majority of the study participants were females 61 (81.3%), rest were males 14 (18.7%). 70.7% (n=53) study participants had completed high school education. 45 (60%) of study participants belonged to APL category, rest 30 (40%) belonged to BPL category. The Occupation details of the study participants are shown in Table No.1. The type of employment whether temporary or permanent and different work stations are mentioned in the table.

2 Habits of the study population

69(92%) of the study population were never users of tobacco. Among the 6 (8%) ever users, 2 were ex-users and only 4 (5.3%) were current users. Median duration of use was 20 years (IQR=4) the median number of cigarette smoked per day was 5.5 (IQR=5). 6 (8%) of study population were ever users of alcohol and all of them were males. Among the 6 (8%) ever users, 2 were ex-users, 2 were ex-

...
ers and only 4 (5.3%) were current users. Median duration of alcoholism was 10 years (IQR = 7.5). None of the female subjects ever used tobacco or alcohol.

3 Medical history

None of the study subjects had past history of Hepatitis B. 7 (9.3%) of the study subjects had one of their family members with Hepatitis B. 31 (41.3%) of study population suffered from one or more of the self reported chronic illnesses. The most common chronic ailment was hypertension with a prevalence of 16% among the study participants. The study subjects were classified as normotensives, prehypertensives and hypertensives according JNC 8 criteria. The findings are represented in Figure No.1. 21.3% of the study subjects were hypertensive. 4 (5.33%) of the study subjects were newly diagnosed as hypertensive during the study.

4 Hepatitis-B Immunization and Antibody titre among study participants

96% (72) of the study subjects had taken all the 3 doses of Hepatitis B as per schedule. Only 4% (3) of the study subjects had not rightly adhered to the scheduled immunization timings. Out of the 3 study subjects, two had delayed the 3rd dose by 1 month and one of them delayed the 3rd dose by 3 months. 72 of the study subjects had not reported any adverse events following Hepatitis vaccination. 4% (3) study subjects had reported that they had pain on the injection site on the day of vaccination which lasted only for a day. None of the

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Table 1: Occupational details of the study subjects; N=75

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Table 2: Bivariable analysis showing the factors associated with Adequate Antibody titre (cut off 100IU/L)
study subjects suffered from loss of working days due to adverse events.

The median antibody titre of the study subjects was 1000 (IQR=781). The Geometric mean Antibody titre was 365.76. The distribution of antibody titre among the study population is shown in Figure No.2. Only 4% of the study participants had titre below 10IU/ and those people were recommended to take further vaccination and 53.3% were high responders.

11(14.66%) of the study subjects had inadequate Anti Hepatitis B antibody titre <100IU/L and 64(85.34%) of the study subjects had adequate Anti Hepatitis B antibody titres ≥100 IU/L after three doses of vaccination.

Bivariable analysis was done to find out the factors associated with adequate antibody titre which was taken as ≥ 100 IU/L for health workers as they are at high risk of developing occupational hazard of Hepatitis B. The factors analyzed were gender, Co morbidities, smoking status by Chi square test and Mean age and Mean BMI (Body mass Index) through Student t test. But none of the above factors were significantly associated (p<0.05).The results are shown in table no.2 Bi variable analysis was done with anti-Hepatitis B antibody titre of 1000 IU/L as cut off. Those with antibody titre ≥ 1000 were considered as high responders and < 1000 as low responders. Employment status and presence of Hypertension were found significant (p< 0.05) in Chi square test and are shown in Table no 3.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Category</th>
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<th>Antibody titre ≥ 1000(%)</th>
<th>p value</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>Temporary</td>
<td>71.4</td>
<td>45</td>
<td>0.021</td>
<td>3.05(1.16-7.99)</td>
</tr>
<tr>
<td></td>
<td>Permanent</td>
<td>28.6</td>
<td>55</td>
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<td></td>
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<tr>
<td>Hypertension Status</td>
<td>Present</td>
<td>88.6</td>
<td>70</td>
<td>0.04</td>
<td>3.32 (1.11-11.49)</td>
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<tr>
<td></td>
<td>Absent</td>
<td>11.4</td>
<td>30</td>
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</tbody>
</table>

Table No 3: Factors significantly associated with high Anti Hepatitis B antibody titre

DISCUSSION

Hepatitis B is the most important infectious occupational disease for the health care workers. The high risk of being infected is the consequence of prevalence of virus carriers among health care workers, the high frequency of exposure to blood, body fluids and the high contagiousness of hepatitis B virus⁹.

Risk of transmission of Hepatitis B to health care workers have been studied by many investigators. But studies focusing on grade 2 health care workers which include mainly the marginalized section and who are at greater risk owing to their activities at hospital waste collection and segregation are minimal.

In our study the serologic immune status was assessed at the end of 9 months after the primary vaccination. 100 IU/L anti–HBs level was considered as base value for
adequate antibody titre. Although in many other populations based studies 10 IU/L was considered as minimum value for adequate anti-HBs level. Our study involved higher base value (100 IU/L) because high risk group (grade 2 health workers) being evaluated. Moreover few studies also reveal that success of vaccination programme is established only if the antibody titre is above 100 and revaccination is recommended when the titre falls below 10.

The present study showed an antibody titre of > 100 IU/L among 85.34% of study participants and 96% had adequate antibody titres of >10 IU/L. A study conducted in Germany on the course of antibody titre following vaccination also revealed 97% seroconversion after three doses.

The mean antibody titre in this study was 1095 comparable to our study (1000 miu/ml). A systematic review of literature done in America also showed that 87% of individuals show seroprotection and a study done in among health care workers showed seroconversion in 90% of individuals.

A study conducted in AIIMS, a tertiary care hospital in India showed that only 79% of the health care workers had protective antibody level >10 IU/L which was fairly less compared to other studies. This may be because the titres were not assessed sufficient time after the third dose.

Another study done among the health care workers in tertiary hospitals of northern India also showed a protective antibody titre in 67% of the subjects only and which waned off in time.

Study done in Karnataka (South India) showed seroprevalence of 72% which is also less because it was estimated 10 years after the vaccination.

Several studies have proved the waning of Antibody titre with time and we and couldn’t establish the same because our study participants were assessed following a vaccination drive conducted in same time.

Although the studies done in Kerala is less a recent study on Health Care workers of a tertiary hospital in Central Kerala revealed a protective titre of 81% (>100IU/L) and 93.2% (>10 IU/L) which is in accordance with the present study.

Complementary studies, using an in vitro enzyme linked immunosorbent assay (spot-ELISA), showed that the number of memory B lymphocytes able to produce anti-HBs does not diminish as the level of antibody declines.

Current studies suggest good retention of immunologic memory in healthy vaccinees over periods of 5-12 years. Post vaccination antibody testing and regular testing for antibodies is recommended only to high-risk subjects, especially to health care workers and subjects with immunodeficiency.

In this study out of 14 males, 12 males (85.7%) had anti- HBs level more than 100 IU/L. Out of the 61 females 59(96.7%) had more 100 IU/L anti –HBs level. However, this male to female ratio was statistically non significant (p value = 0.96). Also we couldn’t find any association between age, obesity, smoking status, presence of comorbidities and antibody titre in the present study. These findings could be attributed to small sample size and cross sectional nature of study design. A study conducted in Sri Lanka among health care workers to assess the immune response to hepatitis b vaccination showed that the anti HBs response was significantly higher in females when compared to males (p=.027). The present study, but did not show any significant association between age and immune response.

Another study done in Pakistan showed that male (18%) non responders were frequent than female non responders (8%). They also mentioned that when the age at vaccination is >40 years the rate of seroconversion to anti HBs is less than that of a subset of individuals with age <40. A study conducted by Rachel C Wood on Minnesota health care workers revealed that smoking status and Body mass Index are significantly associated with decreased anti HBsAg antibodies.

Many of the studies done so far such as Weber et al, Simo Minnanna et al has substantiated that obese people with high BMI tend to have lesser immunological response to hepatitis b vaccination. A randomised controlled trial has mentioned a protection rate of 71% in obese individual versus 91% among lean individuals. Many studies have revealed that post immunization titre is important for the formation of an anamnestic response years after vaccination. Hence we did analysis based on high responders and low responders with a titre of 1000 as cut off.

Based on the analysis we found employment status (p =0.021) and hypertension status (p=0.05) significantly associated with high titres. Hypertensives have low antibody response as compared to those without hypertension. Although poor immune response is established among diabetics and chronic kidney disease patients, hypertension may also contribute as these are diseases with common risk factors like obesity, smoking etc.

Health workers who were temporarily recruited through Kudambasree exhibited low antibody titre(<1000 IU/L),the reason for which is unclear but may be due to the characteristic related to the job and stress related to unemployment.

According to a study 5-10% of the population will not respond to Hepatitis B vaccination. Post vaccination testing is essential to find out these non responders as they are susceptible to Hepatitis B infection. Hence the study participants were informed about their immune status, those who were non immune(<10 IU/L) were recommended for complete vaccination series and for further post vaccination serologic testing.
There were few limitations for our study. Most of the studies involving HBV antibody titre were prospective nature with estimation of antibody titre being carried out at different intervals. Our study however was cross sectional in nature and antibody analysis was done only at one point of time. Even though the study was carried out on a small set of sample, the sample was scientifically sufficient to generate information regarding adequacy of antibody titre which can also be generalized.

CONCLUSION
The results of the study showed that the vaccination programme was effective in providing protection to 85% which was consistent with the findings from similar studies across the globe. This study was also useful in identifying the individuals who were sero negative. They could be advised further vaccination strategies to look for non response and use of other protective measures if required. These workers on account of their poor economic potential would not otherwise take vaccine or check their protection levels. We advocate this type of vaccination programmes to be taken up by the health authorities to protect these vulnerable grade II workers. HBV vaccination coverage is still inadequate in our country among high risk groups especially health care workers. The reason could be due to absence of vaccination policies by the hospital management and lack of awareness among health care workers. Three doses of Hepatitis B vaccination should be made mandatory for health care workers at the time of job entry and follow up antibody titre should be done at regular intervals as the cost of Hepatitis B Immunoglobulin given as post exposure prophylaxis is enormously high than the routine vaccination.

Acknowledgement
The authors would like to thank the Grade II health personnel for their valuable time, cooperation and whole hearted participation which they rendered for the study. We would also be grateful to Dr Sara Varghese, HOD Community Medicine, Dr. Mohandas, Superintendent and Dr. Sreedevi Amma Director, ACR Lab, Medical College, Thrivunanthapuram, for their consistent support throughout the conduct of the study. We would also express our gratitude to Dr Indu P S, Convener, State Board of Medical Research for granting permission and financial support for the study.

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Comparative Study on The Effect of Interferential Current Therapy and Ultrasound Therapy in Post-Stoke Hemiplegic Shoulder Pain

Reshma J*, Ravi Sankaran*, George Joseph*, K Surendran*

INTRODUCTION
Shoulder pain is one of the most frequent complications in post-stroke hemiplegic patients, with an incidence of 9% to 73%. The etiology of hemiplegic shoulder pain is multifactorial e.g. adhesive capsulitis, glenohumeral subluxation, rotator cuff injury, complex regional pain syndrome, subacromial bursitis, spasticity etc. Shoulder pain is of great concern as it interferes with rehabilitation, requires added medication, causes disturbed sleep and decreases the overall quality of life.

Aim: To prospectively evaluate the comparative efficacy of Interferential Current Therapy (IFT) and Ultrasound Therapy (UST) in patients with post stroke hemiplegic shoulder pain using Visual analogue scale (VAS), to compare the improvement in passive range of motion (PROM), the improvement in functional level of patients and adverse effects.

Methods: 32 patients satisfying inclusion criteria were allotted into two groups. Pre treatment pain, passive range of external rotation of shoulder and functional status of the patients in both groups were assessed using VAS, goniometer and Barthel Index respectively. Group A received 10 sessions of UST and Group B received 10 sessions of IFT. Patients in both groups received PROM for the shoulder after each treatment session. Post treatment pain and range of motion were reassessed. In the 1 month follow up pain, range of motion & functional status were reassessed.

Results: In this study, there was statistically significant improvement in shoulder pain in Group B compared to Group B in the post treatment assessment, but no significant difference between the two groups were noticed in the 1 month follow up. There was significant improvement in the passive range of external rotation in Group B compared to Group B in both post treatment & 1 month follow up. There was no significant difference in functional status between the two groups in the 1 month follow up.

Conclusion: In this study, it was found that IFT is an effective short term treatment for post stroke hemiplegic shoulder pain compared to UST, with relatively no side effects.

Corresponding Author: K Surendran

ABSTRACT

Background: Shoulder pain is one of the most frequent complications in post-stroke hemiplegic patients, with an incidence of 9% to 73%. The etiology of hemiplegic shoulder pain is multifactorial e.g. adhesive capsulitis, glenohumeral subluxation, rotator cuff injury, complex regional pain syndrome, subacromial bursitis, spasticity etc. Shoulder pain is of great concern as it interferes with rehabilitation, requires added medication, causes disturbed sleep and decreases the overall quality of life.

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INTRODUCTION
Shoulder pain is one of the most frequent complications in post-stroke hemiplegic patients, with an incidence of 9% to 73%. The etiology of hemiplegic shoulder pain is multifactorial e.g. adhesive capsulitis, glenohumeral subluxation, rotator cuff injury, CRPS, subacromial bursitis, spasticity etc. Shoulder pain is of great concern as it interferes with rehabilitation, requires added medication, causes disturbed sleep and decreases the overall quality of life. Post stroke shoulder pain may be managed by pharmacotherapy, local heat and self mobilization, shoulder supports or institutional physiotherapy etc.

Interferential current therapy is used for relieving pain caused by deep tissue injury. Interferential current therapy is application of two medium frequency currents in opposing directions to get a low frequency current (beat frequency) in the tissue plane for therapeutic purposes. Interferential current therapy has been reported to relieve pain related to shoulder in experimental studies, but there is lack of evidence on effect of interferential current therapy in people with hemiplegic shoulder pain.

Therapeutic ultrasound involves the use of high-frequency acoustic energy to produce beneficial effects in tissue. Ultrasonic signals are typically generated using the reverse piezoelectric effect. The physiologic effects of ultrasound can be divided into thermal and non-thermal effects. Thermal effects are produced when acoustic energy is absorbed, producing molecular vibration, which results in heat production. Nonthermal effects include cavitation, media motion and standing waves.

Both interferential current therapy and ultrasound therapy are commonly employed physical modalities, but there have been no studies comparing the efficacy of these two modalities in post stroke hemiplegic shoulder pain. This has prompted us to conduct a pilot study, to prospectively evaluate the comparative efficacy of interferential current therapy and ultrasound therapy in patients presenting with post stroke hemiplegic shoulder pain to the Dept of PMR, Amrita Institute of Medical Sciences, Kochi. This study also compares the functional improvement using Barthel Index, improvement in passive range of motion assessed using goniometer and adverse effects.

METHODS

Selection and description of participants:
This study was conducted among patients attending the outpatient clinic of Physical Medicine and Rehabilitation Department, Amrita Institute of Medical Sciences and Research Centre, Kochi, who were diagnosed to have post-stroke hemiplegic shoulder pain based on history and clinical examination. The study was con-
ducted as per the approval and guidelines of the ethical committee of AIMS – School of Medicine and with the informed, written consent of the participants over a period of 2 years from September 2015 to Sept 2017. Since no study could be located using same scoring pattern for the pain scale, this is a pilot study, which has generated the appropriate hypothesis. A total of 32 cases were randomly distributed into two groups. This study was conducted as a prospective comparative study to compare the efficacy of interferential current therapy and ultrasound therapy in patients with post-stroke hemiplegic shoulder pain. Thirty two patients diagnosed with post-stroke hemiplegic shoulder pain satisfying inclusion and exclusion criteria were selected.

**Inclusion criteria:**
1. Hemiplegic shoulder pain
2. Age 40 to 70yrs
3. Pain in hemiplegic shoulder >4 (on scale of 0 to 10) using Visual Analogue Scale (VAS)
4. Reduction of passive external rotation of at least 20 degrees compared to normal side

**Exclusion criteria:**
1. Pacemaker
2. Skin wounds iii. Infection of affected shoulder iv. Malignant tumours

**Technical information:** The study was conducted at Amrita Institute of Medical Sciences, Kochi, Kerala with the following objectives:

**Primary objective:** To prospectively evaluate the comparative efficacy of Interferential Current Therapy (IFT) and Ultrasound Therapy (UST) in patients with post stroke hemiplegic shoulder pain using Visual analogue scale (VAS).

**Secondary objectives:** To compare 1. The improvement in Range of motion (ROM) measured with goniometer. 2. The improvement in functional level of patients using Barthel index. Adverse effects.

The demographic data was obtained for each patient at the first visit to the outpatient clinic of our department. Also an elaborate history of the presenting complaints, past medical and surgical history, and associated comorbidities were taken. This was followed by a detailed clinical evaluation. The intensity of shoulder pain was measured using VAS, where the score ranges from 0 (no pain) to 10 (worst pain). The functional level of the patient was assessed using Barthel Index. The passive external rotation of the shoulder was measured using a goniometer. Patients with VAS score more than 4 and reduction in passive external rotation of atleast 20 degrees compared to normal side were included in this study.

Of the 32 patients, 15 were treated with ultrasound therapy (Group A) and 17 patients were treated with interferential current therapy (Group B). Patients in Group A were treated with 10 sessions of ultrasound therapy of 1.5W/cm² for 7 minutes, followed by range of motion (ROM) exercises for the affected shoulder. Post 10 sessions pain and passive external rotation of affected shoulder were reassessed using VAS and goniometer respectively. Patients in Group B were treated with 10 sessions of interferential current therapy using medium frequency currents of 4000Hz & 4100Hz to produce amplitude modulated frequency at 100Hz in vector mode, for 20 minutes, followed by ROM exercises for the affected shoulder. After 10 sessions pain and passive external rotation of affected shoulder were reassessed using VAS and goniometer respectively. Patients were advised to continue ROM exercises as home program and to review after 1 month. Both Group A and Group B were reassessed after 1 month for pain, ROM and functional status using VAS, goniometer and Barthel Index respectively.

**Statistics:** Data of all subjects were entered into a computer database and analysis was performed using Statistical Package for Social Sciences version 20 (SPSS Inc., Chicago, IL, USA) with advanced statistical programme.

- To test the statistical significance of the difference in mean changes of the VAS score from basal to follow up period between the two groups, student’s t test was applied. The same test was applied to test the difference in mean changes in functional levels between the two groups.
- To compare change in ROM & adverse effects between the two groups Fisher’s exact test was applied.

**METHODS**

In this study the average age in UST group 59.53 ± 11.42 and that of IFT group is 60.53 ± 8.32. The p-value is 0.778 (Table 1). There is no statistically significant difference in the distribution of age between the two groups. The percentage of males in UST group is 73.3 and that in IFT group is 70.6. The percentage of females in UST group is 26.7, and that in IFT group is 29.4 with a p-value of 1.00 (Table 1). Therefore the association of gender in both groups are comparable. The mean time from stroke (in months) in UST group is 3.58 ± 4.64 and that in IFT group is 1.88 ± 1.58 with a p-value of 0.165. There is no statistically significant difference in the mean time from stroke between the two groups.

In this study, 13 patients (86.67%) in UST group and 13 patients (76.47%) in IFT group have ischemic stroke, while 2 patients (13.33%) in UST group and 4 patients (23.53%) in IFT group have haemorrhagic stroke with a p-value of 0.4. Nine patients (60%) in UST group and 14 patients (82.35%) in IFT group have right sided hemiplegia, while 6 patients (40%) in UST group and 3 patients (17.65%) in IFT group have left sided hemiplegia. Both groups are comparable at baseline for distribution of sidedness with a p-value of 0.160.

Eight patients (53.33%) in UST group and 6 patients (35.29%) in IFT group are diabetic. Both groups are comparable at baseline with a p-value of 0.304. Twelve patients (80%) in UST group and 14 patients (82.35%) in IFT group are hypertensive. Both groups are comparable at baseline with a p-value of 0.864. Four patients...
<table>
<thead>
<tr>
<th>Variable</th>
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<th>n=32</th>
<th>UST n=15</th>
<th>IFT n=17</th>
<th>p value</th>
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</thead>
<tbody>
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<td>Total Age (years)</td>
<td></td>
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<td>60.03</td>
<td>59.53 (11.42)</td>
<td>60.53 (8.32)</td>
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<tr>
<td>Male</td>
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<td></td>
<td>15 (68.2%)</td>
<td>23</td>
<td>11 (73.3%)</td>
<td>12 (70.6%)</td>
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<td>13 (86.67%)</td>
<td>13 (76.47%)</td>
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<td>Ischemic</td>
<td>Haemorrhage</td>
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<td>4 (23.53%)</td>
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<td>9 (60%)</td>
<td>14 (82.35%)</td>
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<td>Left</td>
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<td>6 (40%)</td>
<td>3 (17.65%)</td>
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<td>8 (53.33%)</td>
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<td>Systemic hypertension</td>
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<td>12 (80%)</td>
<td>14 (82.35%)</td>
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<td>4 (26.67%)</td>
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<td>Coronary artery disease</td>
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<td>4 (23.53%)</td>
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</tr>
<tr>
<td>Others (seizure, hypothyroidism, chronic kidney disease, atrial fibrillation)</td>
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<td>6</td>
<td>2 (13.33%)</td>
<td>4 (23.53%)</td>
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<td>Brunnstrom staging</td>
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<td>7 (41.2%)</td>
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<td></td>
<td>Grade 1</td>
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<td>3 (20%)</td>
<td>5 (29.4%)</td>
<td>0.876</td>
</tr>
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<td>Grade 1+</td>
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<td>5 (33.3%)</td>
<td>5 (29.4%)</td>
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<td></td>
<td>Grade 2</td>
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<td>4 (26.7%)</td>
<td>5 (29.4%)</td>
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Table 1: Comparison of baseline variables between groups

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<tr>
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<th>UST n=15</th>
<th>IFT n=17</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barthel Index</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>19.33</td>
<td>13.99</td>
<td>18.82</td>
</tr>
</tbody>
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Table 2: Comparison of difference in functional status as measured using Barthel Index pre and post 1 month between groups
Comparative Study on The Effect of Interferential Current Therapy and Ultrasound Therapy in Post-Stoke Hemiplegic Shoulder Pain

(26.67%) in UST group and 2 patients (11.76%) in IFT group are dyslipidemic. Both groups are comparable at baseline with a p-value of 0.281. Four patients (26.67%) in UST group and 4 patients (23.53%) in IFT group have coronary artery disease. Both groups are comparable at baseline with a p-value of 0.837. Two patients (13.33%) in UST group and 4 patients (23.53%) in IFT group have other comorbidities like seizure, hypothyroidism, chronic kidney disease, atrial fibrillation. Both groups are comparable at baseline with a p-value of 0.460 (Table 1).

The mean VAS score at baseline for UST group is 6.87 ± 0.64 and that for IFT group is 7.06 ± 0.827. The p-value obtained is 0.473. Therefore the baseline VAS score of patients in both groups are comparable. The mean Barthel Index score at baseline for UST group is 24 ± 25.15 and that for IFT group is 22.94 ± 23.58. The p-value obtained is 0.903. Therefore the functional status of patients in both groups are comparable at baseline. The mean PROM at baseline for UST group is 44 ± 11.05, and that for IFT group is 46.76 ± 9.34. The p-value obtained is 0.449. Therefore the passive range of external rotation of patients in both groups are comparable at baseline.

The mean VAS score difference in pre and 10 days follow up for UST and IFT groups are 1.86 ± 0.74 and 3.41 ± 0.61 respectively, with a p-value of <0.001 (Figure 1). There is highly significant statistical improvement in VAS score for IFT group in the post session assessment compared to UST group. The mean VAS score difference in pre and 1 month follow up for UST and IFT groups are 3.60 ± 1.72 and 4.11 ± 1.21 respectively, with a p-value of 0.371. There is no statistically significant difference between the two groups in the VAS score in post 1 month follow up assessment.

The mean Barthel Index score for UST group is 19.33 ± 13.99, and that of IFT group is 18.82 ± 10.53. The p-value obtained is 0.788 (Table 2). Therefore the improvement in the functional status achieved in both groups are almost the same, and there is no statistically significant difference between the groups.

The mean passive range of external rotation difference in pre and 10 days follow up for UST and IFT groups are 8.0 ± 4.14 and 17.05 ± 6.13 respectively, with a p-value of <0.001 (Figure 2). There is statistically highly significant improvement in passive range of external rotation for IFT group in the post session assessment compared to UST group. The mean passive range of external rotation difference in pre & 1 month follow up for UST and IFT groups are 12.33 ± 7.28 and 18.23 ± 8.82 respectively, with a p-value of 0.042 (Figure 3). There is statistically significant improvement of passive range of external rotation for IFT group in post 1 month follow up assessment, compared to UST group.

DISCUSSION

To the best of our knowledge this is the first study comparing the efficacy of ultrasound therapy and interfer-
interferential current therapy in post-stroke hemiplegic shoulder pain. Ultrasound therapy and interferential current therapy are frequently used modalities for shoulder pain but there is paucity of studies to prove its efficacy in post-stroke hemiplegic shoulder pain.

In this study the baseline age, sex distribution, Modified Ashworth scale, Brunnstrom staging, VAS score, Barthel Index and passive range of external rotation were comparable between the two groups. The patient demographics and baseline outcome measures are shown in table 1. Out of the 32 patients included in the study, 23 (71%) were males, which is similar to the study by Rah UW et al. But in the studies by Chae J et al., Wissel J et al., Leandri M et al. and Suriya-amarit D et al. have female preponderance in their studies.

In this study the mean age is 60 ± 9.74, which was similar to the studies by Chae J et al., Wissel J et al. and Rah UW et al. Out of 32 patients 26 (81%) have ischaemic stroke and 6 (19%) have hemorrhagic stroke.

Among the 32 patients in this study, 23 (71%) had right sided hemiplegia. Lindgren I et al. found that left sided hemiparesis, frequently reported pain and reduced passive abduction of affected shoulder are risk factors for long lasting post-stroke shoulder pain. Thirty one patients had various comorbidities. The most frequently reported comorbidities were hypertension and type 2 diabetes mellitus, which were present in 26 and 14 patients respectively. Predictors of post-stroke shoulder pain are decreased motor function, diabetes, age, diminished proprioception and tactile extinction.

The mean time of onset of shoulder pain after stroke in Group A (ultrasound therapy) is 3.58 ± 4.64 months and that of Group B (interferential current therapy) is 1.88 ± 1.58 months. Broeks J G et al. found that occurrence of shoulder pain after stroke and the prevalence over time varies considerably in literature. This could be due to differences in inclusion criteria and length of follow up.

Both groups showed improvement in pain, but Group B was found to have better improvement in pain than Group A as evidenced by the significant reduction in mean VAS score (p value <0.001). This improvement is short term, as there was no significant difference in VAS score (p value 0.371) between the groups at 1 month follow up. Two patients in Group A had increase in VAS score in 1 month follow up compared to 10 days follow up. The exact mechanism of interferential current therapy in reducing pain is not known. This short term advantage of interferential current therapy over ultrasound therapy could be attributed to the Wedensky inhibition.

Both groups showed improvement in passive range of movement, with statistically significant improvement in Group B compared to Group A in both 10 days and 1 month follow up. This could be attributed to better pain relief in Group B, resulting in better patient compliance in the rehabilitation programme.

Both groups showed functional improvement, but there was no statistically significant difference in Barthel Index score between the two groups at 1 month follow up.

In a study on the effect of interferential current therapy in hemiplegic shoulder pain by Suriya-amarit D et al. they found that there was statistically significant improvement in pain as measured using 11-point Numerical Rating Scale (NRS) and range of motion in the treatment group compared to control group.

In another study by Rahman et al. to compare the efficacy of pregabalin and therapeutic ultrasound versus therapeutic ultrasound alone on patients with post-stroke shoulder pain, they found that there was statistically significant improvement in pain as measured using VAS score in patients receiving both pregabalin and therapeutic ultrasound compared to therapeutic ultrasound alone.

These are the only two studies were either therapeutic ultrasound or interferential current therapy has been used for the treatment of post-stroke hemiplegic shoulder pain. There were no studies found comparing the efficacy of these two modalities in post-stroke hemiplegic shoulder pain.

Both modalities are relatively safe, with no adverse effects noted during the study. The results of this study should be validated in further studies before being used to inform patients.

Limitations of the Study
There was no control group in this study. Patients with diverse etiologies for post-stroke shoulder pain were included in the study. As the sample size was small, our ability to generalize the results of this study to the broader stroke population and clinical practice is limited.

CONCLUSION
This study suggest that interferential current therapy is an effective short term treatment for post-stroke hemiplegic shoulder pain compared to ultrasound therapy as evidenced by the significant reduction in the mean VAS score in the 10 days follow up. But in the 1 month follow up there was no significant difference in the VAS score between the two groups.

The increase in the passive range of motion of shoulder is better for the interferential current therapy group than for the ultrasound therapy group as evidenced by the significant increase in range of motion using goniometer in both 10 days and 1 month follow up.

Both groups show improvement in functional status, but there is no statistically significant difference in between the two groups.

Both modalities are relatively safe as there were no side effects noted during the study.
REFERENCES


Nephron Sparing Surgery for Large Extra Renal Angiomyolipoma in First Trimester of Pregnancy
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INTRODUCTION
Neoplasms are rare in pregnancy; they present a challenge because of the special considerations and implications in treatment. We report a large Angiomyolipoma (AML) in a 27 year old lady, presenting in the first trimester of pregnancy and managed by nephron sparing surgery (NSS).

CASE REPORT
27 year old primi gravida with 12 weeks of gestation, married 9 months back, presented with left sided loin pain. On examination, she was pale and had mild loin tenderness. Her haemoglobin was 11 gm%. Renal function was normal. Ultrasonogram (USG) showed a retroperitoneal mass around the left kidney if size 16x13 cms, with the kidney being pushed medially. Magnetic Resonance Imaging (MRI) was done, which showed a tumour with fat content, with cystic areas within and evidence of intrallesional haemorrhage suggestive of AML. The patient had normal neurologic and skin examination, thus excluding Tuberous Sclerosis. In consultation with the Obstetrician, excision of the AML (attempts NSS) was planned after termination of pregnancy as the chance of Intra Uterine Death was high during prolonged exposure to general anaesthesia. Computed Tomogram (CT) angiogram was done after therapeutic abortion which showed a feeding vessel to the tumour that was distinct from the renal artery. The intratumoural vessels showed multiple aneurysmal dilatations with evidence of bleeding. In view of these CT findings, exsanguinating bleed was anticipated during the procedure. AML excision was done three weeks after therapeutic abortion. Intra-operatively, there was a well encapsulated 16x13 cm tumour encasing the kidney with a single large feeding vessel distinct from the renal artery. The tumour was extra-renal and had minimal adhesions to the kidney. Tumour excision was done preserving the kidney. Post operative period was uneventful and patient was discharged on post operative day4. Histopathology was suggestive of epitheloid Angiomyolipoma. HMB 45 Immunohistochemistry (IHC) confirmed the diagnosis.

DISCUSSION
According to Martin et al, second most common renal tumours detected in pregnancy2. The mean gestational age of patients at the time of diagnosis is 27.7 weeks. Most of the cases reported are less than 10 cms and are incidentally detected in the third trimester, of which, two were larger than 9 cms (Table 1). Both required Nephrectomy, either due to bleeding or fetal death3.

Figure 1(Left): MRI image of the AML and the Gravid Uterus. (Right): CT image showing a vascular extra-renal AML.

Figure 1(Left): Extra-Renal location of the AML, just abutting the Kidney. (Right): Excised tumour specimen.
The tumour in our patient was missed during the first trimester USG. Thus, there is deficiency when scanning patients by confining the study to the pelvis during first trimester obstetric ultrasonographic evaluation. This could be the reason why most AMLs are diagnosed in the third trimester of pregnancy. There is a possibility of hormonal influence on these tumours which cause them to increase rapidly in size during the course of pregnancy\(^6\). Early diagnosis can obviate the catastrophes of a later diagnosis, which may necessitate nephrectomy or unintentional termination of pregnancy.

**REFERENCES**

An Interesting Case of Aortoventricular Tunnel
Renjini B A*, Vinod M*, Aravind*, Sujata Sridharan*

INTRODUCTION
Aorto Left Ventricular Tunnel is an extremely rare congenital cardiac malformation with good long-term outcome after early surgery. The exact incidence is unknown, estimates ranging from 0.5% of fetal cardiac malformations to less than 0.1% of congenitally malformed hearts in clinico-pathological series1 About 130 cases have been reported in the literature2.

CASE SUMMARY
11 year old male child, born to parents of 3 degree consanguinous marriage, from a middle class socio economic status presented to us with complaints of palpitations. Parents revealed past history of being diagnosed as a case of congenital heart disease at 4 months of age following complaints of failure to thrive and recurrent respiratory tract infections. The child was put on anti-failure medication till the age of 5 years. Child was lost to follow up from the hospital from 5 years of age.

Currently on examination his pulse was high volume, collapsing and peripheral signs of aortic regurgitation were present. There was evidence of cardiomegaly, S1 soft, Hills sign +, Duroseiz sign + Grade 4/6 harsh systo-lo-diastolic murmur heard all over the precordium with diastolic component more over the upper left sternal border.

Echo reported at 4 months of age revealed small VSD and Mild AR. Repeat Echo at 2 years of age showed 12 mm tunnel along right side of aorta and sub pulmonic VSD. Cardiac catheterization was done at 4yrs of age which showed no evidence of VSD, Separate channel from aorta to LV just above RCA, Regurgitation through tunnel with normal aortic valve.

Current CXR confirmed cardiomegaly and ECG showed LVH. Echo showed non valvular AR, 64 SLICE CT showed a tunnel of length 2cm & caliber 7mm originates from the aorta just above the right coronary sinus and coursing posteriorly around the aorta and traversing through the interventricular septum and terminating into the superior most part of Lt ventricle just below aortic annulus. LV dilated 7 X 7.7cm (Fig 1). Child underwent patch closure of the distal aortic end, direct closure of the proximal LV tunnel and External plication of the external tunnel. He is doing well now.

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DISCUSSION
AV tunnel is an extracardiac channel which connects the ascending aorta above the sino-tubular junction to the cavity of ventricle. Associated defects involving proximal coronary artery and semi-lunar valves are seen. The aetiology is the maldevelopment of cushions which form the aortic and pulmonary root, and the abnormal separation of these structures. Although extremely rare AV tunnel is the most common cause of abnormal blood flow from aorta to ventricle in infancy. It usually presents as heart failure in first year life and signs of AR will be prominent. Differential Diagnosis of the condition includes VSD with AR, Sinus of Valsalva aneurysm, Aorto-Pulmonary window, valvular AS with AR. Investigations include Echocardiogram, cardiac catheterization, Cardiac CT. Surgical correction is the treatment of choice.

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REFERENCES
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