

Volume : 1 Issue : 1

2014

July-September

ISSN No (P) : 2350-0360

ISSN No (E) : 2393-9869



International Journal of Integrated Medical Research

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ADDRESS FOR CORRESPONDENCE:

Ms. Jigna Manvar, Executive Editor, IJOIMR
Email: contactijoimr@gmail.com, editor@ijoimr.com

PUBLISHER:

International Journal of Integrated Medical Research

PRINTED AT:

Kavya Enterprises
Sf-10, Jay Jalaram Housing Flat,
Opp. Bahucharaji Mandir,
Karelibag, Vadodara, Gujarat, India.
Email: contactijoimr@gmail.com, editor@ijoimr.com

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ORIGINAL ARTICLE

Quality Assessment of Health Care Services Provided by Health Workers in Jamnagar District of Gujarat, India

Lodhiya Kaushik K.^{1*}, Jogia Priyanka D.², Yadav Sudha B.³

¹Assistant Professor, Department of Community Medicine, PDU Medical College, Rajkot

²Assistant Professor, Department of Obstetrics and Gynaecology, PDU Medical College, Rajkot

³Professor and Head, Department of Community Medicine, M.P. Shah Medical College, Jamnagar

ABSTRACT

BACKGROUND: About 74% of the population of India resides in the rural areas. They primarily depend on the Health Workers (HWs) regarding their health matters. **Aims:** The present study was conducted to assess the quality of the various health care services provided by the HWs, by probing the awareness and utilization of these services by the rural people. **MATERIALS AND METHODS:** This was a cross-sectional descriptive study conducted in all the 37 main villages where the various Primary Health Centers (PHCs) of Jamnagar district are located. 10 mothers (having a child less than two years age and who had availed the local government health care services) were randomly selected per village for the survey. **RESULTS:** Only 32.7% and 77.3% mothers knew the names of HWs-Male and HWs-Female functioning in their area, respectively. About 40% of the eligible women did not receive benefits of Janani Suraksha Yojana (JSY) and Chiranjivi Yojana (CY). More than half (55.1%) of the mothers did not receive any postnatal health visit by the HWs. 26.2% respondents did not receive any postnatal family planning counseling. Diphtheria, Pertussis and Tetanus (DPT) vaccine was wrongly injected in the gluteal region in 25.7% of the children. Only 4.6% of the mothers could correctly describe the technique for chlorinating a pot of drinking water. **CONCLUSION:** The HWs did not fully provide the health care services to the rural people. The services found to be grossly deficit were home visits, Information, Education and Communication (IEC) activities and faulty vaccination practices.

Keywords: Awareness, Gujarat, Health Workers, postnatal services, Quality of Services, utilization of services.

INTRODUCTION

More than three quarters of the population of India live in rural areas. Many of these being in remote areas take long time to be reached by the people. India does not have adequate health manpower. Their actual numbers are all grossly inappropriate considering the suggested norms. The situation is even more pathetic in rural India where about 27% of all the doctors (present in India) cater to 74% of the Indian population.¹ Under these circumstances the health of the rural masses depend largely on the

*Corresponding Author

Dr. Kaushik K Lodhiya
101, Jagdish apartment, Manhar plot-19,
Rajkot-360001, Gujarat. India
Email: Kaushiklodhiya@gmail.com

semi-skilled Auxiliary Health Workers, who are scattered across the entire country. India is divided into states and each state is further subdivided into 'districts'. The health care of a district is taken care by the 'Primary Health Centers' (PHCs) which in turn refer the serious patients to either the 'Community Health Centers' (CHCs) or directly to the district level 'Civil Hospitals' or Medical College Hospitals. The staffing pattern of a PHC includes a Medical Officer and a range of Auxiliary Health Workers. The Health Workers- male and female (HWs-M, HWs-F) are, since long, the lowest level of the grass-root workers (barring the recently formulated ASHA-Accredited Social Health Activist) who cater to

the first hand health care of the masses. Besides offering preventive and curative health care, they are also expected to cater to various promotive aspects of health care management among the rural population.¹ Despite the government's efforts to deliver health services to the doorsteps of rural masses through innovative approaches, the utilization of health services is still far below any acceptable standard. Quality of service delivery is one of the important factors determining the utilization of health services in addition to the availability, cost of services, as well as social structure, health beliefs and personal characteristics of the users.^{2,3,4} Quality assessment is an administrative tool for monitoring performance to determine whether it continues to remain within the acceptable bounds.⁵ It depends on performances of the providers of health care system and contributions from the beneficiaries.⁶ Hence a quality assessment of the services provided by the health workers was carried out by looking into the awareness of the people regarding the various health care services in order to improve their utilization.

MATERIALS AND METHODS

This was a cross sectional descriptive study conducted in the rural areas of Jamnagar district of Gujarat state. In the Indian set up, womenfolk (and more so mothers) are the principal caretakers---not just for their children, but also for the entire family. They are intricately involved in the day to day care and wellbeing of the family. Hence, they were chosen as the key respondents of this study. The study objective necessitated that those mothers who had young children be given preference since they would have more interactions with the health care providers than others. In order to further minimize the recall bias, those mothers who were having a child less than two years old and had sought government healthcare services were selected as the 'participants' of this study. Considering that most of the villages receiving health care form a single PHC are being located far and

wide, the health services are generally the best in the main village in which the PHC is located. In order to get an understanding of the best possible situation, the main villages of all the 37 PHCs of Jamnagar district were selected for this study. A list of all the eligible 'participants' present in the PHC village was prepared and 10 such 'participants' were randomly selected (using lottery method) for further interviewing. A total of 370 'participants' were thus interviewed between 2010 and 2011. After fully explaining the purpose of the study, informed verbal consent of the mothers was taken. A pre-tested, semi-structured in-depth performa for data collection was used which considered the important job responsibilities of the health workers. Indian Public Health Standards (IPHS)⁷ and their training modules were used as benchmarks for comparative purposes. The data were entered and analyzed using the Microsoft Office Excel 2007. Results are presented as percentage and their 95% confidence limits.

RESULTS

As a part of their 'active' surveillance activities, HWs-M have to specifically enquire about cases of fever during their household visits. HWs as well as ICDS functionaries along with ASHA are actively involved in distribution as well as counseling of the people to consume the antifilarial medicine (Diethyl carbamazine-DEC) which is distributed as a part of the yearly Mass Drug Administration (MDA) campaign towards elimination of Filaria. Besides HWs-M are to keep the people regularly updated on various health related services like 'Kalyan Chabadi',⁸ importance of correct usage of Chlorine tablets for drinking water purification etc. For any such fruitful inter-personal communications (IPC), it is necessary that there be a cordial relationship between the health provider and the beneficiary: knowing the name of the health provider can act as a proxy indicator of this aspect. Table 1 sheds some light into the interactions between the HWs-M and the

mothers. Health Workers-Female (HWs-F) are primarily involved in matters pertaining to women and child welfare. They are involved in conducting village 'Health and Nutrition Days' (Mamta Divas) where a range of welfare activities targeting antenatal and postnatal care, infant and young child feeding techniques, child immunization etc. are carried out. The Janani Suraksha Yojana (JSY)¹ and the Chiranjivi Yojana (CY)⁹ are special government sponsored schemes targeted to reduce the maternal and infant mortality. Antenatal women belonging to 'Below Poverty Line' (BPL) families are to be identified by the health personnel and the HWs-F are expected to specifically counsel them towards availing the various benefits under the JSY and CY. Table 2 deals with the responses concerning these antenatal services received by the women during their last childbirth. In spite of the various efforts to encourage institutional delivery, about 27% of the women had their last child delivered in their homes (Table 3). In

72.2% of the women, their delivery was conducted by a doctor while in 16.2% of the participants, the delivery was conducted by a 'trained person' (Nurse/ HW-F/Trained Birth Attendant). There were 11.6% deliveries which were conducted by an untrained person. The HWs-F are to make 'home visits' to the mothers during their postnatal period. Besides conducting postnatal health checkup of the mother and examining the newborn child, she also advises the family upon obtaining a Birth Certificate of the child as well as various aspects pertaining to Infant and Young child Feeding (IYCF), importance of timely vaccination of the child as per the National Immunization Schedule. In order to minimize dangers of nerve injury, the site of Diphtheria Pertusis Tetanus (DPT) vaccination had been shifted by the government from the gluteal region to the anterolateral aspect of the mid thigh region.¹⁰ The compliance of these various aspects is shown in Table 4.

Table 1: Interaction between the mothers and Health Workers-Male (N=370)

Response by the mother regarding	Yes	%	95% C. I.
Able to name the HW-M of their area	121	32.70	27.92-37.48
Enquired by any HW-M regarding any case of fever during the last one year	152	41.08	36.07-46.09
Anti-Filarial drugs (DEC) distributed to the family	341	92.16	89.42-94.90
Anti-Filarial drugs (DEC) consumed by mother*	291	83.6	65.14-100
Correctly describes the technique of Chlorine tablet use for drinking water purification†	17	4.59	2.46-6.72
Heard about 'Kalyan Chabadi'‡	4	1.08	0.03-2.13
Able to name the contents of 'Kalyan Chabadi'	1	0.27	0.0-0.80
*Out of those who were given the DEC tablets (n=341)			
† Crushing the Chlorine tablet, prior to dissolving it in a cup of water, straining the water (using a fine cloth to remove the white floccules), then pouring the filtrate into a pot of drinking water (20 litres), shaking the water and allowing a contact period of 30 minutes before consuming the water.			
‡A community based distribution outlet for providing a 'basket' of health products (Oral Rehydration Solution-ORS packets, Iron Folic Acid-IFA tablets, Oral Contraceptive Pills-OCPs, condoms, etc.). 'Kalyan' implies benefit and 'Chabadi' implies a basket in the local vernacular.			

Table 2: Interaction between the mothers and Health Worker- Female during their last antenatal period (N=370)

Response by the mother regarding	Yes	%	95% C. I.
Able to name the HW-F of their area	286	77.3	73.03 – 81.57
Knows about ‘Mamta Divas’ *	99	26.76	22.25- 31.27
Hemoglobin estimation done during last pregnancy	137	37.03	32.11-41.95
Urine examination done during last pregnancy	290	78.38	74.19-82.57
Peripheral smear done for Malaria parasites during pregnancy	297	80.27	76.21-84.33
Benefits received under JSY/CY [†]	87	59.58	51.62-67.54
*Knows of the various activities undertaken during the Mamta Divas			
[†] Among 146 respondents who were eligible for JSY/CY			

Table 3: Place of last delivery (N=370)

Place of delivery	No	%	95% C. I.
Home	100	27.03	22.50-31.55
Sub Centre*	4	1.08	0.03-2.13
Government hospital [†]	106	28.65	24.04-33.26
Private hospital	160	43.24	38.20-48.29
*Sub Center is the lowest recognized strata of government health set up in India which has a building and is managed by a HW-F			
[†] Includes- PHC, CHC, district level Government Hospital and Medical Colleges			

Table 4: Postnatal services received from the HW-F (N=370)

Postnatal services	Yes	%	95% C. I.
Received at least one home visit by the HW-F during postnatal period	166	44.86	39.79-49.93
Advised regarding obtaining birth certificate of the child	288	77.84	73.61-82.07
Advised regarding Infant and Young Child Feeding (IYCF) techniques	156	42.16	37.13-47.19
Advised against pre-lacteal feeds	173	46.76	41.68-51.84
Advised against any applications on umbilical cord stump	184	49.73	44.64-54.82
Advised regarding technique of bathing the newborn	240	64.86	60.00-69.72
Number of children given all the vaccines due for the age of the child*	310	83.78	80.02-87.54
Number of children who were given the DPT injection in the thigh	275	74.32	69.87-78.77
Counseled for Family Planning	271	73.24	68.73-77.75
*As per the guidelines of the Government of India			

DISCUSSION

About 59% of the mothers replied in the negative regarding malaria surveillance activities by HWs-M. The educational component of intake of DEC during MDA for Filariasis elimination was also lacking as 16.4% had not consumed DEC in spite of being

given the same. The findings of Rangnath BG,¹¹ Kumar et al.¹² and coverage report of Mass Drug Administration round 2010¹³ were even more poor than that in the present study. These findings indicate hindrances for the success of National Vector Borne Disease

Control Program (NVBDCP) of the government of India. (Table 1) The knowledge regarding the proper use of the Chlorine tablets was very less (4.6%). The mere supply of health products under 'Kalyan Chabadi' becomes of no use as the very knowledge of their availability and hence their use in turn become abysmally low (1%). Nearly two-third of the respondents did not know the names of HWs-M and one fourth did not know of the names of the HWs-F who were serving their area. This suggests poor interpersonal interaction of between the HWs and the community. (Table 1) Many important components of antenatal care services (like Hemoglobin estimation, urine examination, peripheral smears for malaria parasite detection) were not regularly done. About 40% of the eligible women did not receive the benefits under JSY or CY. In the District Level Household Survey-III (DLHS-III)¹⁴ of Gujarat it was found that only 9.5% of the mothers had received benefits under the JSY. In a study in 10 districts of Rajasthan state of India in 2006¹⁵ it was found that only 23 % of the eligible women had received benefits of JSY. Although the findings of the present study are somewhat better than earlier studies, the benefits of various maternity benefit schemes have still not reached to all the beneficiaries. This indicates lack of awareness about the health care services provided by the Government as well as indifferent attitude of the HWs towards Information, Education and Communication (IEC) activities in the community. (Table 2) The findings of the present study on institutional delivery are encouraging as more than three fourth of the deliveries were institutional as compared to that of National Family Health Survey-III (NFHS-III)¹⁶ (40.8%), District Level Household and Facility survey DLHS-III of Gujarat¹⁴ (56.5%) and Nandan et al.¹⁷ in Varanasi district (69.6%). (Table 3) However less than half of the women (44.86%) in our study had received at least one home visit

during the postnatal period. The corresponding finding was a little better in case of DLHS-III (Gujarat)¹⁴ (59.5%) but worse in study of Nandan et al.¹⁷ in Varanasi district (29%). NFHS-III¹⁶ of India and Lady Health Worker Programme¹⁸ of Pakistan had reported lower frequency of home visits being conducted (38%) than that in our study (Table 4). This indicates that follow-up services to the recently delivered mothers were poor. The post-natal visits provide an opportunity to the care providers for early detection of any complication to the mothers and anomalies in new-born during puerperium, advice on IYCF and provide counseling on family planning. The relative lack of post-natal visits impedes the overall quality of services being provided. Hence future policy should be framed so as to improve follow-up services to the mothers in the form of post natal visits. Regarding the mothers advised on breast feeding, the results of Lady Health Worker Programme¹⁸ of Pakistan and that of our study are similar (40%). However the results of our study (73%) are much better than Lady Health Worker Programme¹⁸ (40%) regarding provision of counseling services to the mothers on family planning. Although 84% of the children had received appropriate vaccines as per their age, 25% of them were given DPT injection in the buttocks (in spite of clear guidelines to inject DPT in the thigh). This suggests a need to train the HWs on immunization services. NFHS-III¹⁶ and DLHS-III of Gujarat¹⁴ reported that 43.5% and 54.9% of the children between one to two years were fully immunized respectively. Performance Assessment of Health Workers Training in Routine Immunization in India (2009)¹⁹ shows that about 70% of the children had received vaccines due for their age. (Table 4) In addition to quality of services provided other factors such as availability & accessibility of health facility, socio-economic, demographic and cultural factors such as age, sex, education,

employment, caste, autonomy, residence, etc also play an important role in determining the utilization of health care services. These factors need to be studied in depth to improve the utilisation of health care services.

CONCLUSION

The public health educational activities of the HWs were poor. This had led to poor awareness of various health related aspects and consequently poor utilization of government health schemes. It needs to be highlighted that this study was done in the main village where the PHC was located: which normally have comparatively better health scenario than the other remote villages of the PHC! The HWs need to be sensitized about their job responsibilities and the adverse impact that their negligence can have on the health of the community. Better quality of IPC between the HWs and the community will lead to a need based demand driven utilization of health services. Operation research in this direction needs to be carried out to improve the quality of health services delivered by the HWs to the rural masses. **Limitations of the study:** Broad spectrum of reasons about failure in providing quality of services to the rural masses by health care providers could not be investigated in the present study. These reasons need to be investigated in depth to plan suitable interventions.

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ORIGINAL ARTICLE

Role of psycho-social stress as a risk factor for coronary artery disease: A case control study among the people of Rajkot District

Gohel BM^{1*}, Nagar SS², Patel AB³, Bhogayata KH⁴, Vithalani TN⁵, Chhaya BM⁶

¹Assistant Professor, Department of Community Medicine, PDU Govt. Medical College, Rajkot

²Professor, Department of Community Medicine, GCS Medical College, Ahmedabad

³Assistant Professor, Department of Community Medicine, GMERS Medical College, Gotri, Vadodara

⁴Assistant Professor, Department of Dravyaguna, Sheth JP Govt. Aayurved Medical College, Bhavnagar

⁵Ex. Assistant Professor, Department of Pathology, PDU Govt. Medical College, Rajkot

⁶Assistant Professor, Department of Shalakya, GMERS Medical College, Valsad

ABSTRACT

BACKGROUND: CAD is a multifactorial disease. Since ancient time stress is claimed as one of the major risk factor of CAD. Not all the cases of CAD can explain their etiology on the basis conventional risk factors like, high blood sugar, hypertension, obesity, smoking etc. The study was done to know the role of psychosocial stress and acute life events as a risk factor of CAD. **Objective:** to assess the role of stress as a risk factor for CAD. **MATERIALS AND METHODS:** the study was designed as a case control study. 130 cases and 130 controls were included in the study. The cases were taken from the PDU Govt. Medical college hospital Rajkot and the controls were from the community of Rajkot district area. Detailed history, examination and scoring were applied with the help of standard pretested questionnaire. The results were analysed using X² and Z test. **RESULTS:** Mean age for CAD was found 53.43 years. Male female ratio was 4:1. Mean psychosocial stress among cases of CAD was 28.05 which is more than controls (Z=14.02, P<0.01). Acute stressful life event were more frequent among cases of CAD (mean events = 1.29, Z=7.8, P<0.01). Other factors found significant role in causation were obesity, sedentary life style, hypertension and diabetes. **CONCLUSION:** It is found that psychosocial stress is a risk factor for CAD.

Keywords: Case-control study, psychosocial stress, CAD

INTRODUCTION

It is rightly said that we are again in the age of great pandemics and our plague is cardiovascular diseases. CAD ranks first as a cause of premature death in industrialized country⁽¹⁾. Every hour on an average 90 people are dying due to cardiovascular disease in India⁽²⁾. Transition of our country from the under developed to the developing one has already

*Corresponding Author

Dr. Gohel Bharat M.

Assistant Professor,

Department of Community Medicine, PDU Govt. Medical College, Rajkot

Email: dr_bharatgohel@yahoo.co.in

given us an increased burden of cardiac diseases. If appropriate action is not taken, an estimated 20 million people will die from cardio-vascular disease every year, mainly from heart attacks and stroke⁽³⁾. India can ill afford the expensive curative approach for millions suffering from CAD. Intensive care units are in fact turning in to expensive care units for both patient and nation. It is roughly estimated that annually India spends about Rs. 100 billion as direct cost of treatment of CAD. The amount is equivalent to 0.8% of Indian GNP⁽⁴⁾. CAD has reached enormous proportion, striking more and more in younger subjects. Even people of

younger age group and their thirties and forties are no longer immune from this disease previously associated with old age. The conventional risk factors like hypertension, diabetes mellitus, tobacco use, obesity and family history of CAD are not able to fully explain the emerging epidemic of CAD. People of lower risk group may develop CAD and many of allegedly high risk group may not develop this disease, from this it appears that this list is either incomplete or insensitive. Estimate of the amount of population variance that can be explained by traditional risk factors such as smoking, cholesterol, blood pressure, glucose intolerance and diabetes range from 21 to 42%⁽⁵⁾. Charaka, the father of ancient medicine system of India – Ayurveda, wrote in 1000 BC: “overeating, heavy and fatty meals, worries, sedentary habits and over indulgence in sleep are the causes of cardiac diseases to kapha”⁽⁶⁾. Lukas E⁽⁷⁾, in his study on the effect of a three minute mental stress task on endothelium dependant vasodilatation in healthy subjects without cardiovascular risk-factors, pointed out from his study that mental stress induces prolonged endothelium dysfunction, which is prevented by selective endothelin-A receptor antagonism. An extensive body of evidence from animal models (especially the cynomolgus monkey, macaca fascicularis) reveals that chronic psychosocial stress can lead, probably via mechanism involving excessive sympathetic nervous system activation, to exacerbation of coronary artery atherosclerosis as well as transient endothelial dysfunction and even necrosis⁽⁸⁾. The effects of stress are likely to depend on the interaction of at least three factors; the nature of stressor, its perception by the individual and the physiological susceptibility of an individual⁽⁹⁾. So it is a time to trace out the long claimed ‘psycho-social stress’ as a risk factor for CAD.

Objective:

1. To study the role of socio-demographic profile of cases and controls

2. To determine the level of psycho-social stress among cases and controls
3. To assess the role of acute events of life cycle as an influencing factor of CAD.
4. To assess the role of other known established risk factors of CAD.

MATERIALS AND METHODS

The present study was designed as case control study (retrospective study) and it was conducted in the territory of Rajkot district including urban and rural area both. The standard questionnaire, prepared by ICMR, and standard pre-tested instruments were used. Verbal consent was taken before including any subject in a study⁽¹⁰⁾. The sample size of the study was determined using the formula⁽¹¹⁾:

$$N_1=N_2=\frac{\{Z_{1-\alpha/2}[2P(1-P)]^{1/2} + Z_{1-\beta}[P_1(1-P_1)+P_2(1-P_2)]^{1/2}\}^2}{(P_2-P_1)^2}$$

Where, $\alpha=0.05$ (allowed type-I error), $\beta=0.02$ (allowed type-II error). So for these values of type-I and type-II errors, $Z_{1-\alpha/2}=1.96$ and $Z_{1-\beta}=0.84$. $P_1=0.80$ (probability of cases with high stress in previous similar study)⁽¹²⁾, $P_2=0.64$ (probability of controls being with high or very high level of stress in this study, it was determined that prevalence of stress among controls to be at least 20% less than that of the cases). $P=(P_1+P_2)/2=0.72$. Putting all the values in the above mentioned formula the desired sample size was found to be 122.32. For the convenience of calculation the nearly round figure 130 was used as desired sample size. As the case: control ratio is kept 1:1, final total sample size of the study became 260 (130 cases and 130 controls).

Selection of Cases: All the patients, well conscious, cooperative and well oriented with time, place and person residing in the territory of Rajkot district and fitting in the definition of case, were eligible to participate in the study. Medicine Department of PDU Government Medical College Hospital Rajkot was identified as a source of cases.

Definition of the case: Diagnosis of CAD followed the WHO criteria⁽¹³⁾, it required at least two of the following elements: (1) Acute Myocardial Infarction with ECG showing ST segment elevation (2) Acute Myocardial Infarction without ECG showing ST segment elevation but raised creatine kinase (CK-MB) isoenzyme or troponin (3) unstable angina pectoris with ECG showing ST segment depression and normal enzymes (4) complain of left sided chest pain which is compressive in nature, ill localized, radiating in nature and may or may not be associated with nausea, vomiting, palpitation or excessive sweating and difficulty in breathing.

Selection of controls: All persons, well conscious, cooperative and well aware with time, place and person, who voluntarily agree to participate, were eligible to participate in the study. It was decided to interview controls from the community, as the stress is to be evaluated by the pre-tested questionnaire and hospital controls are likely to influence the response adversely because of the stress related to hospitalization and their current illness. Controls were selected from the three localities namely urban slum, urban non-slum and rural areas. Same number of the controls as of stratified in the cases were selected from respective areas. The areas were selected by lottery method of random sampling technique. Ramkrishna nagar ward 9 Rajkot city, Lohanagar Rajkot city and PHC Piparadi of Jasdand block were selected randomly by lottery method to serve the controls from urban non-slums, urban slums and rural area respectively.

Definition of control: For the purpose of this study, person who never suffered from angina pectoris or acute myocardial infarction were considered as control. It was assured by in depth and intensive history about sign symptoms of CAD.

Matching: To avoid selection bias, matching was done in regard of three characteristics: (1) Age, (2) Sex and (3) Area of residence. Age matching is done with the liberty of ± 2 years of

age. The study was carried out from March 2007 to February 2008.

Analysis: Data entry and data analysis was done using Epi info 6 software.

RESULTS AND DISCUSSION

Table 1: Age and sex wise distribution of cases.

Age (years)	Male	Female	Total	%
< 40	12	01	13	10.0%
40 to < 50	22	09	31	23.8%
50 to < 60	44	13	57	43.8%
60 to < 70	24	03	27	20.8%
≥ 70	02	00	02	1.5%
Total	104	26	130	100.0%
%	80.0%	20.0%	100.0%	

Most of the cases (43.8%) in the study were found in the age group of 50 to 60 years. 10% of cases were below the age of forty years. Male : Female proportion is found to be 4 : 1. Narayan PS et al⁽¹²⁾ found maximum cases in the age group of 45 to 54 years (61.6%). Many workers have previously observed the peak age of occurrence of AMI in the 6th decade of the life, like, Malhotra et al⁽¹⁴⁾ (1958) and Banerjee et al⁽¹⁵⁾ (1960). The mean age of CAD incidence was found as following in various studies: Yilmaz N et al⁽¹⁶⁾ (2007) 53 years, Kasliwal et al⁽¹⁷⁾ (2006) 59.73 years, Mohanan P et al⁽¹⁸⁾ (2005) 60.47 years. The age incidence found in this study shows CAD occurrence at an earlier age. Diwedi S et al⁽¹⁹⁾ in their study found the same male: female ratio as 4: 1. It was found in the study that educational status or type of family have no significant role in the occurrence of CAD. Other risk factors like tobacco use, alcohol consumption, sedentary life style, diabetes, hypertension and obesity were showing consistency with other studies as risk factors for CAD. The same results were found in the study of Narayan PS et al⁽¹²⁾.

Table 2: Distribution of various risk factors among cases and controls.

Sr. No.	Variable	Cases	Controls	Statistical test	P value	
1	Mean Age (±SD)	53.43 (±8.95)	53.63 (±9.01)	Z=0.18	P>0.05	
2	Residence	Urban non-slum	73	73	56.15%	NA
		Urban slum	19	19	14.62%	
		Rural	38	38	29.23%	
3	Marital Status*	Currently married	99	112	x ² =4.24 d.f.=1	P<0.05
		currently single	31	18		
4	Educational status	no schooling	28	33	x ² =4.64 d.f.=2	P>0.05
		primary schooling	36	48		
		secondary or more	66	49		
5	Type of family	Nuclear	43	58	x ² =3.64 d.f.=1	P>0.05
		Joint	87	72		
6	Mean psychosocial stressor's score (±SD)*	28.05 (±8.95)	14.45 (±6.42)	Z=14.02	P<0.01	
7	Mean number of acute life events (±SD)*	1.29 (±0.94)	0.51 (±0.65)	Z=7.8	P<0.01	
8	Occurrence of acute life event in last one year*	Yes	98	55	x ² =29.36 d.f.=1	P<0.001
		No	32	75		
9	Tobacco user*	Yes	64	44	x ² =6.32 d.f.=1	P<0.05
		No	66	86		
10	Alcohol users*	Yes	26	13	x ² =5.10 d.f.=1	P<0.05
		No	104	117		
11	Physical activity*	Sedentary	79	34	x ² =31.70 d.f.=1	P<0.001
		Non-sedentary	51	96		
12	Diabetic*	Yes	48	13	x ² =26.24 d.f.=1	P<0.001
		No	82	117		
13	Hypertension*	Yes	55	18	x ² =24.12 d.f.=1	P<0.001
		No	75	112		
14	Mean BMI (±SD)*	25.58 (±6.44)	22.99 (±2.26)	Z=4.32	P<0.01	

*Significant P value

Mean psychosocial stressors' score in present study is found 28.05 (SD=8.95) for cases and 14.45 (SD=6.42) for controls. The difference is statistically significant (Z=14.02, P<0.01). it indicates that people facing more stress are more prone to be the victims of CAD. Narayan PS et al ⁽¹²⁾ in their study on role of psychosocial stress in AMI found that mean psychosocial stressors' score in cases was 32.31

(SD=7.37) which was significantly more than that of controls 20.89 (SD=6.29) (P<0.0001). Stephen JB et al ⁽²⁰⁾ in their study on stress and CAD noticed that there is strong and consistent evidence that depression is an independent risk factor for clinical CAD and its prognosis. Numbers of acute life events are found 1.29 and 0.46 events for cases and controls respectively in present study. The difference is found

statistically well significant ($Z= 7.8, P < 0.01$). Narayan PS et al ⁽¹²⁾ in their study on role of psychosocial stress in AMI found that mean stressful life event score in cases was (3.59 ± 1.58) which was significantly more than that of controls (2.17 ± 1.15) ($P<0.0001$). The same outcome was also found in other studies. Russek HI ⁽²¹⁾ (1960) found presence of stressful life event in 91% of CAD patients. In his study Russek HI ⁽²²⁾ (1965) observed that 87.18% of the CAD patient had passed through stressful life cycle events. Arvind AS ⁽²³⁾ found in his study on role of stressful life events and psychosocial stress in CAD, that more than 70% of subjects had a history of some sort of acute life event. It is also found in present study that three fourth (75.38%) cases have suffered at least one of the acute life events, while only 42.30% controls suffered it since last one year up to the time of surveyed date.

Table 3: Distribution of cases and controls according to level of felt psychosocial stress.

Level of stress	Cases	Cont rols	Statistical test	P value
Negligible	0	7	$X^2=117.60$ d.f.=2	$P<0.001^*$
Mild	8	67		
Moderate	28	43		
High	32	6		
Very high	62	7		
Total	130	130		

It is found in present study that about 60% of cases were facing very high level of psychosocial stress, while more than 60% of controls were facing mild level of psychosocial stress. The difference in felt level of psychosocial stress is found to be highly significant among cases and controls ($\chi^2 = 117.58, d.f. =2, P<0.001$). This is supported by the study of Narayan PS et al ⁽¹²⁾ on role of psychosocial stress in AMI, who found that high level of stress was present in 20% of cases as compared to 8% controls. 59.2% of cases were feeling very high level of stress as compared to 3.2% of controls. Stephen JB et al

⁽²⁰⁾ also in their study on stress and CHD noticed that the CHD risk is directly related to the severity of depression: a 1–2-fold increase in CHD for minor depression and 3–5-fold increase for major depression. The strength of the association is of similar magnitude to that of standard risk factors such as smoking or hypercholesterolaemia.

Table 4: Distribution of various acute life events during last one year among the cases

Sr. No.	Acute life event	Frequ ency	% (n=98)
1	Death of close relative	32	32.7%
2	Severe illness of self	38	38.8%
3	Severe illness of relative	31	31.6%
4	Separation / divorce of own	4	4.1%
5	Separation / divorce of family member	22	22.4%
6	Loss of job / financial loss	25	25.5%
7	Violent incident / attack / robbery	15	15.3%

In present study highest frequency of acute life event among cases is found for severe illness of self (38.78%), and other major contributors are, death of close relative (32.65%) and severe illness of relative (31.63%). While for control group highest numbers of respondents have faced severe illness of relative (29.09%), and other major contributors are death of close relative (27.27%) and severe illness of self (23.64%). When pattern of acute life event was analyzed by Narayan PS et al ⁽¹²⁾ in their study on role of psychosocial stress in AMI it was found that: Death of close relative (16%), severe illness or accident of family ember (32%), serious financial loss (10.25%) and Loss of job (8.2%). Sumantray SK et al ⁽²⁴⁾ (1975) carried out the case control study to determine the relation between stress and CAD. They found that 85.3% of these cases were to have significant stressful life situations in contrast to 20% controls. Analysis of stresses revealed that family worries were presenting 85% cases while none of the controls had family worries.

This association was found to be statistically significant. Feilding Richard ⁽²⁵⁾ observed that overwork, worry and other social stresses were most frequently perceived causes of coronary artery diseases. Singh SB et al ⁽²⁶⁾ found that acute myocardial infarction is significantly related to stressful life events. Death of close family members, negative changes in financial status and increased job responsibilities seem to play significant role in the onset of AMI.

CONCLUSION

CAD is not uncommon now in the fifth or even fourth decade of life (mean age 53.43 years and 10% below forty). Males are at four fold greater risk than females for CAD (M: F ratio is 4:1). Incidence of CAD is higher among urban population (70.77%) than the rural population (29.23). Unmarried/widowed/separated/divorced person are at greater risk of being affected by CAD ($\chi^2 = 4.24$, d.f. =1, $P < 0.05$). may it be because of increased amount of mental stress. All subjects with CAD are found having high level of psychosocial stress (Mean psychosocial stressors' score 28.05. ($Z = 14.02$, $P < 0.01$). More subjects with CAD (72.31%) as compared to controls (10%) are found facing/feeling high or very high level of psychosocial stress. ($\chi^2 = 117.58$, d.f. =2, $P < 0.001$). Acute stressful events of life cycle are also found having important role as a risk factor for CAD. On an average each subject with CAD is found facing 1.29 acute life events. ($Z = 7.8$, $P < 0.01$). Habit of tobacco consumption ($\chi^2 = 6.32$, d.f. =1, $P < 0.05$), Habit of alcohol consumption ($\chi^2 = 5.08$, d.f. =1, $P < 0.05$), sedentary life style ($\chi^2 = 31.68$, d.f. =1, $P < 0.001$), diabetes mellitus. ($\chi^2 = 26.24$, d.f. =1, $P < 0.001$), hypertension ($\chi^2 = 24.12$, d.f. =1, $P < 0.001$), and obesity ($Z = 4.32$, $P < 0.01$) were found having their role in occurrence of CAD. However type of family and educational status were found having no significance association with occurrence of CAD.

Limitation of study: Multivariate analysis was not done. In this study because of resource limitations history was used as a tool to choose

controls and exclude the cases. As the cases were selected from the PDU government medical college hospital Rajkot, there is chance of selection bias. Customers of private hospitals and their epidemiological characteristics are not reflected in the study.

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Major Risk Factors for coronary atherosclerosis

C N Gajera¹, C I Tailor², S C Gajera³, G P Govekar⁴, P V Chandegara⁵, Pankaj Prajapati^{6*}

¹Assistant Professor, Department of Forensic Medicine & Toxicology, PDU Medical College, Rajkot

²Assistant Professor, ³Professor, ⁵Tutor, Department of Forensic Medicine, Govt. Medical College, Surat

⁴Medical Officer, General Practice, Rajkot.

⁶Assistant Professor, Department of Forensic Medicine & Toxicology, Government Medical College, Baroda

ABSTRACT

BACKGROUND: The prevalence of early age atherosclerosis in India is increasing these days. The prevalence of atherosclerosis among individual which cause ischemic heart diseases is related to number of factors. There are several studies done on identifiable risk factors for coronary atherosclerosis. **Objective:** The objective of the study was to analyse the major risk factors (Age, Sex, Diabetes and Hypertension) for coronary atherosclerosis. **MATERIALS AND METHODS:** The study was carried out from January 2011 to June 2012 on 164 bodies received in department of Forensic Medicine, Government Medical College, Surat. The material of study comprised of all medico legal death. History of age, sex, diabetes, hypertension etc was taken. After gross examination, samples of hearts were examined for histo-pathological examination for grading of atherosclerosis. **RESULTS:** Out of total cases, 144 cases were of male and 20 cases were of female. Maximum (36) cases were in the age group of 40 to 50 years. A positive correlation of age, diabetes and hypertension was found with atherosclerosis. Multiple logistic regression analysis was done, independent demographic predictor of a good knowledge level was statistically significant (<0.05), adjusted odd ratio was 4.01 for diabetes and 3.39 for hypertension. **CONCLUSION:** The study show definite correlation between risk factors and atherosclerosis. Certain lifestyle modification can decrease the incidence of atherosclerosis.

Keywords: Diabetes, Hypertension, Risk factors, coronary atherosclerosis, CAHD, Incidence

INTRODUCTION

The atherosclerosis term is derived from Greek, where atheroma means soft lipid rich material in centre of atheroma and sclerosis (scaring) means connective tissue in plaques; accumulation of atherosclerotic plaques in pericardial coronary arteries leading to coronary atherosclerotic heart diseases (CAHD).¹It is common multifarious problem today and it is leading cause of mortality and morbidity in developed as well as developing country.²By 2020, the disease is forecasted to be the major cause of morbidity and mortality

in most developing nations.³The risk factors for CAD are mainly classified in modifiable and non-modifiable. Modifiable factors include hypertension, diabetes, dyslipidaemia, obesity and smoking while non-modifiable factors include age, sex, race and family history for CAD.⁴CAHD remains the highest cause of mortality in India, and the majority of cases are due to risk factors that include hypertension, smoking, Diabetes Mellitus (DM), and elevated serum cholesterol levels.⁵Knowledge of the predisposing risk factors is an important step in the modification of lifestyle behaviours conducive to optimal cardiovascular health in developing countries.⁶

MATERIALS AND METHODS

The study was carried out at the department of forensic medicine, Government Medical College, Surat during the period from July 2011

*Corresponding Author

Dr. Pankaj Prajapati
Assistant Professor,
Department of Forensic Medicine and
Toxicology, Govt. Medical College,
Baroda

Email:

to July 2012. The study includes 164 samples of heart of both male and female. The samples were received from bodies arrived for autopsy in both natural and unnatural (accidental, suicidal, homicidal) cause of death. Decomposed bodies were not included in the study. For examination of heart was collected and washed completely under tap water to remove blood clots. Weight of hearts were recorded, examined grossly and then fixed in 10% formalin for 3 days. All three main coronaries were identified and examined by putting incision at the distance of 0.5 cm. Calcification, hardening and narrowing of artery were noted by gross examination. All sections of arteries were stained in haematoxylin and eosin stain for examination in microscope under 40X power.

RESULTS

Thus in our study, of the total 164 cases, 144 were of males and 20 were of females. They were divided into age groups of <20 years, >20 to 30 years, >30 to 40 years and so on, exclusive lower limit and inclusive upper limit. The majority of the participants were in the age group of >40 to 50 years age group and as we had seen, majority of cases were males. P value of the table no-1 is 0.465, and of table no-2 is <0.0000001.

Table 1: A ge and Sex wise distribution of study.

Age in Years	Sex		Total
	Male	Female	
<20	12 (8.3%)	3 (15%)	15 (9.15%)
>20-30	28 (19.4%)	3 (15%)	31 (18.90%)
>30-40	28 (19.4%)	6 (30%)	34 (20.73%)
>40-50	41 (28.4%)	2 (10%)	43 (26.22%)
>50-60	21 (14.5%)	4 (20%)	25 (15.24%)
>60	14 (9.7%)	2 (10%)	16 (9.76%)
Total	144 (100%)	20 (100%)	164 (100%)

As we can see from table-2 and 3, the maximum cases of atherosclerosis in coronary were found in the age group of >40-50 years, then in the age group of >50-60 years. Minimum cases of atherosclerosis in coronary were found in the age group of <20 years and then in the age group >20-30 years. In the age group of >60 years, out of 16, eleven cases contain atherosclerosis in coronary. Out of 50% cases of atherosclerosis, majority number of cases had grade-V

Table 2: Age and Atherosclerosis.

Age in Years	Atherosclerosis Not Found	Atherosclerosis Found	Total
<20	14 (17%)	1 (1.2%)	15 (9.15%)
>20-30	29 (35.4%)	2 (2.4%)	31 (18.90%)
>30-40	24 (29.3%)	10 (12.2%)	34 (20.73%)
>40-50	7 (8.5%)	36 (43.9%)	43 (26.22%)
>50-60	3 (3.7%)	22 (26.8%)	25 (15.24%)
>60	5 (6.1%)	11 (13.4%)	16 (9.76%)
Total	82 (100%)	82 (100%)	164 (100%)

atherosclerosis, 28% cases had grade-IV atherosclerosis, 7.3% had grade-III atherosclerosis, only 1.2% cases had grade-II atherosclerosis while grade-I atherosclerosis was not found in any case. In age group <20 years (comprising 9.15% of all cases), only one cases had atherosclerosis in coronary while rest 14 cases had no atherosclerosis. In age group >20-30 year age group (comprising 18.90% of all cases), only 2 cases had atherosclerosis while 29 cases had no atherosclerosis. In age group >30-40 year age group (comprising 20.73% of all cases), only 10 cases had atherosclerosis while 24 cases had no atherosclerosis. In age group >40-50 year age group (comprising 26.22% of all cases), 36 cases had atherosclerosis while 7 cases had no atherosclerosis. In age group >50-60 year age group (comprising 15.24% of all cases), 22

cases had atherosclerosis while only 3 cases had no atherosclerosis. In age group >60 year age group (comprising 9.76% of all cases), 11

cases had atherosclerosis while only 5 cases had no atherosclerosis.

Table 3: Age and Atherosclerosis

Age in Years	Atherosclerosis Not Found	Atherosclerosis Found					Total
		Grade -I	Grade -II	Grade -III	Grade -IV	Grade -V	
<20	14 (17.1%)	0	0	0	1 (1.2%)	0	
>20-30	29 (35.4%)	0	0	0	2 (2.4%)	0	
>30-40	24 (29.3%)	0	1 (1.2%)	1 (1.2%)	4 (4.9%)	4 (4.9%)	
>40-50	7 (8.5%)	0	0	4 (4.9%)	7 (8.5%)	25 (30.5%)	
>50-60	3 (3.7%)	0	0	1 (1.2%)	6 (7.3%)	15 (18.3%)	
>60	5 (6%)	0	0	0	3 (3.7%)	8 (9.8%)	
Total	82 (50.0%)	0 (0.0%)	1 (0.6%)	6 (3.7%)	23 (14.0%)	52 (31.7%)	164 (100.0%)

Table 4: Sex and Atherosclerosis

Sex	Atherosclerosis Not Found	Atherosclerosis Found				
		Grade-I	Grade-II	Grade-III	Grade-IV	Grade-V
Male	70(85.4%)	0	1(1.2%)	6(7.3%)	17(20.7%)	50(60.8%)
Female	12(14.6%)	0	0	0	4(4.9%)	4(4.9%)
	82(100%)	0	1(1.2%)	6(7.3%)	21(25.6%)	54(65.7%)
		82(100%)				

Table 5: Diabetes and Atherosclerosis (N=164)

Diabetes	Atherosclerosis not present	Atherosclerosis present					Total
		Grade -I	Grade- II	Grade- III	Grade- IV	Grade-V	
Present	4 (2.44%)	0	0	0	4 (2.44%)	10 (6.10%)	18 (10.98%)
Absent	78 (47.56%)	0	1 (0.61%)	6 (3.66%)	17 (10.37%)	44 (26.83%)	146 (89.02%)

As above mentioned in table no.-4, out of total cases of male (i.e. 144=87.80% of all cases), 70 cases had no atherosclerosis while in 74 cases had some or more atherosclerosis. In all cases of male with atherosclerosis (i.e. 74), 1 (1.2%) cases had grade-II, 6 (7.3%) had grade-III, 17 (20.7%) cases had grade-IV, 50 (60.8%) cases had grade-V atherosclerosis. Out of total cases of female (i.e. 20=12.20% of all cases), 12

(14.6%) cases had no atherosclerosis while in 8 cases had atherosclerosis. In all cases of female with atherosclerosis (i.e. 8), 4 (4.9%) cases had grade-IV and 4 (4.9%) cases had grade-V atherosclerosis. P value of table no-4 is 0.33. Out of total cases, 10.98% cases had history of diabetes. Out of these, in only 2.44% cases atherosclerosis were not present, while in 6.10% cases grade-V atherosclerosis and in

2.44% cases grade-IV atherosclerosis were found in coronary. Out of total cases 89.02% cases had no history of diabetes. Out of which,

Table-6: Hypertension and Atherosclerosis (N=164)

Hypertension	Atherosclerosis not present	Atherosclerosis present					Total
		Grade -I	Grade- II	Grade- III	Grade- IV	Grade-V	
Present	8 (4.88%)	0	0	2 (1.22%)	6 (3.66%)	14 (8.54%)	30 (18.29%)
Absent	74 (45.12%)	0	1 (0.61%)	4 (2.44%)	15 (9.15%)	40 (24.39%)	134 (81.71)

Table-7: Diabetes with Hypertension and Atherosclerosis (N=164)

Diabetes + Hypertension	Atherosclerosis not present	Atherosclerosis present					Total
		Grade- I	Grade- II	Grade- III	Grade- IV	Grade-V	
Present	0	0	0	0	2 (1.22%)	4 (2.44%)	6 (3.66%)
Absent	70 (42.68%)	0	1 (0.61%)	4 (2.44%)	13 (7.93%)	34 (20.73%)	122 (74.39%)

47.56% had no atherosclerosis, while in 26.83% cases grade-V atherosclerosis, in 10.37% cases grade-IV atherosclerosis, in 3.66% cases grade-III atherosclerosis and in 0.61% cases grade-II atherosclerosis were found in coronary. Out of total cases, 18.29% cases had history of hypertension. Out of which, only 4.88% had no atherosclerosis, while in 8.54% cases grade-V atherosclerosis, in 3.66% cases grade-III atherosclerosis and in 1.22% cases grade-II atherosclerosis were found in coronary. Out of total cases, 81.71% cases had negative history for hypertension. Out of which, 45.12% had no atherosclerosis, while in 24.39% cases grade-V atherosclerosis, in 9.15% cases grade-IV atherosclerosis, in 2.44% cases grade-III atherosclerosis and in 0.61% cases grade-II atherosclerosis were found in coronary. Out of total cases, 3.66% cases had history of both diabetes and hypertension. Out of which, all cases had atherosclerosis. In 2.44% cases grade-V atherosclerosis and in 1.22% cases grade-IV atherosclerosis were found in coronary. Out of all cases, 74.39% cases had neither diabetes nor hypertension. Out of which, 42.68% had no atherosclerosis, while in 20.73% cases grade-V

atherosclerosis, in 7.93% cases grade-IV atherosclerosis, in 2.44% cases grade-III atherosclerosis and in 0.61% cases grade-II atherosclerosis were found in coronary.

DISCUSSION

In our case study, majority cases were of males (87.81%). Major cases of the study (i.e. 26.2%) were belong to age group between 40 to 50 years. Minimum cases were belonging to age group of more than 60 years (i.e. 9.76%). Atherosclerosis found to be appear in the age group between 30 to 40 years and rare in first three decades of life, which is consistent with the study of Strong and McGill study,⁷ which also mentioned that atherosclerosis is rare in first 10 year of life but rapidly increased in succeeding decades. In our case study, atherosclerotic changes in coronary present majority in age group between 40 to 50 years in which, only 16% of total cases had no atherosclerosis while rest 84% cases had atherosclerosis in the age group. Our study also supported by McGill study⁸ which mentioned that atherosclerosis increase rapidly in succeeding age groups during third decade. Bloom and fawcet study⁹ and Shankar Dayal Gupta and Associate study¹⁰ mentioned that the

thickness of wall of coronary arteries increased with age. Rashmideopujari and associate study¹¹ also support that atherosclerotic diseases appeared in later life is begins much earlier in life. The mean age in Atul S. Keche study¹² is 43.98 years in males and 38.56 years in females as he has considered age groups ranging from 10-19 years to 60 and above years.

Table 8: Diabetes and Atherosclerosis

Diabetes	Atherosclerosis present	Atherosclerosis not present	Total
Present	14 (77%)	4 (23%)	18 (100%)
Absent	68 (46%)	78 (54%)	146 (100%)
Total	82 (50%)	82 (50%)	164 (100%)

For Diabetes: - Odd ratio = 4.01 and P value = 0.0124

Table 9: Hypertension and Atherosclerosis.

Hypertension	Atherosclerosis present	Atherosclerosis not present	Total
Present	22 (73%)	8 (27%)	30 (100%)
Absent	60 (44%)	74 (56%)	134 (100%)
Total	82 (50%)	82 (50%)	164 (100%)

For Hypertension: - Odd ratio = 3.39 and P value = 0.00468

In our case study out of total cases, 18(11%) cases found with positive history of diabetes. Out of total cases that had diabetes, 14(77%) cases had atherosclerosis while rest only 4(23%) cases had no atherosclerosis. 146(89%) of total cases had no diabetes; out of them 78(54%) cases had atherosclerosis while rest 68(46%) cases had no atherosclerosis in coronary. P value of the study is 0.01249 which indicate the result of the study is significant. Odd ratio is 4.01 which indicate the risk of atherosclerosis is 4.01 times more in diabetic person than non-diabetic. Our study is consistent with Galderis and associate study¹³ which has mentioned that the prevalence of atherosclerosis is more for diabetic, out of all

cases of atherosclerosis of his study, 20.3% cases had diabetics(p value for that study was <0.05). Kannel WB study¹⁴ state that relative risk of atherosclerosis in diabetic is 2.4 in men and 5.1 in women. In our case study out of total cases, 30(18%) cases found having hypertension. Out of total cases that had hypertension, 22(73%) cases had atherosclerosis while rest only 8(27%) cases had no atherosclerosis. 134(88%) of total cases had no hypertension; out of them, 60(44%) cases had atherosclerosis while rest 74(56%) cases had no atherosclerosis in coronary. This indicates that the risk of atherosclerosis is 29% more in hypertensive cases than non-hypertensive cases. Odd ratio is 3.39 which indicate that the risk of atherosclerosis is 3.39 times higher in hypertensive than non-hypertensive person. P value of the study is 0.00468 which indicate the result of the study is significant. Our study is supported by Mats Rosenlund study¹⁵ which also indicate hypertension as a risk factor for atherosclerosis in coronary especially in last decade. Whitehall study¹⁶ also support our study, which mentioned that hypertension is risk factor for atherosclerosis in coronary. MuntherK. Homoud¹⁷ observed Hypertension as a risk factor for coronary artery diseases.(50 million in the US, 1/3 undiagnosed, 3/4 under treated, Classification of HTN Normal BP: systolic < 120 mmHg AND diastolic < 80 mmHg, Prehypertension: systolic 120-139 OR diastolic 80-89 mmHg, Hypertension: systolic > 140 OR diastolic > 90 mmHg.)

CONCLUSION

164 hearts obtained from autopsies were studied. Cases included cause of death due to head injury, haemorrhagic shock, burns, asphyxia, poisoning, suspected myocardial infarction, pulmonary tuberculosis. The coronary arteries were evaluated for grade of atherosclerosis. The incidence of atherosclerosis of the coronary arteries was found to be more in males then females. Atherosclerotic changes in coronary are rare in

first three decades of life. There is a consistent tendency for increased severity of atherosclerosis with increasing age. Maximum chances of atherosclerosis are between 40 to 50 years. Diabetic person has 4.01 times more risk of atherosclerosis than non-diabetics. Hypertensive had 3.39 times more risk of atherosclerosis than non-hypertensive.

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ORIGINAL ARTICLE

Comparison of clinical performance of I-GEL and proseal LMA in elective surgeries

Apeksha Patwa^{1*}, Santosh Naik², Archana Endigeri³

^{1,2,3}Assistant Professor, Department of Anaesthesiology, Medical College, Baroda

ABSTRACT

BACKGROUND: Objective: I-gel is a novel supraglottic airway device without an inflatable cuff which differentiates it from other supraglottic airway devices. This study was carried out to compare the clinical performance of I-gel with PLMA in adult patients undergoing elective surgeries under general anaesthesia. **MATERIALS AND METHODS:** A prospective randomised controlled study was carried out in 60 ASA I/II patients undergoing elective surgeries. They were randomly divided into two groups comprising of 30 patients each. **GROUP-I:** Patients in whom I GEL was inserted. **Group-P:** Patients in whom PLMA (Proseal laryngeal mask airway) was inserted. Following parameters were recorded, tabulated and statistically analysed in both the groups, Effective airway time, attempts for insertion of the device and nasogastric tube, hemodynamic changes, oxygen saturation, EtCO₂ and post operative complications. **RESULTS:** In our study, the Effective airway time was significantly less in I-gel group (17.63 ± 2.22 sec) compared to PLMA group (30.93 ± 2.67 sec), p < 0.001. Regarding ease of insertion, attempts for insertion of airway device and nasogastric tube, hemodynamic changes, oxygen saturation, EtCO₂ and post operative complications were comparable in both the groups. **CONCLUSION:** Thus I-Gel is an acceptable alternative supraglottic airway device to PLMA with significantly lesser time of insertion.

Keywords: I-Gel, LMA, airway device

INTRODUCTION

The major responsibility of anaesthesiologist is to provide adequate ventilation to the patient. Management of airway has come long way since the development of endotracheal intubation to the present day usage of sophisticated devices. The success of the classic laryngeal mask airway in resuscitation and anaesthesia has led to the introduction of several supraglottic airway devices into clinical practice. They offer several advantages over the tracheal tube with regard to ease of insertion, hemodynamic stability, favourable respiratory mechanics and decreased airway morbidity.¹⁻⁵

*Corresponding Author

Dr. Apeksha Patwa
B-31/32, Kailash park Duplex,
AIMS Oxygen Line, Akshar Chowk
Old Padra Road,
Vadodara.

Email: patwaapeksha@gmail.com

Proseal laryngeal mask airway (PLMA) and I-gel are two supraglottic airway devices designed for use with spontaneous as well as intermittent positive pressure ventilation, which provide higher oropharyngeal seal pressure(OSP).^{6, 7} The oesophageal seal of the two devices was compared and it was reported that both the devices allowed a fast and complete drainage of oesophageal fluid through the open oesophageal lumen. The PLMA has been used as a safe alternative to endotracheal tube during PPV while the I-Gel is still being evaluated for its use in anaesthesia with PPV. I-gel airway is a novel and Innovative supraglottic airway management device designed to overcome the limitations of LMA Proseal. It is a truly anatomical device, achieving a mirrored impression of the pharyngeal, laryngeal and peri laryngeal

structures, without causing compression or displacement trauma to the tissues and structures in the vicinity.⁷⁻¹¹ The aim of this study was to compare the clinical performance of I-Gel and PLMA during routine surgical procedure.

MATERIALS AND METHODS

After the approval of local scientific and ethical committee, a prospective randomised comparative study was carried out with 60 adult patients of either sex between 20 - 60 years, who were randomly selected from the list of routine surgical procedures under general anaesthesia lasting ≤ 2 hr, from our institute, SSG Hospital, Govt. Medical College, Vadodara during the period of January 2010 to March 2011.

Selection of the Patient:

- ASA physical status I or II
- Age group between 20 – 60 years
- Undergoing Elective surface surgical procedure (breast fibroadenoma, inguinal hernia, gynaecomastia, lipoma / sinus, skin grafting)

Exclusion Criteria:

- Patients with anticipated difficult airway.
- Patients with risk of regurgitation or aspiration.
- Patients with cervical spine disease.
- Morbidly obese patients.
- Pregnant patients.
- Patients with URTI in past 10 days.
- Mouth opening < 2.5 cms.

Investigation and Consent:

Routine investigations carried out in all the patients. All patients underwent detailed pre-anaesthetic check up. All the selected patients were explained about the purpose, procedure and side effects of the study and written informed consent was taken.

Pre-operative Preparation:

All the patients were kept nil by mouth (NBM) for 10 hrs. All the patients were randomly allocated in two groups. **Group I: Patients in whom I GEL was inserted. Group P:**

Patients in whom PLMA (Proseal laryngeal mask airway) was inserted.

Anaesthesia Procedure:

On the day of surgery, Inj. Glycopyrrolate 0.2 mg i.v; Inj. Ranitidine 50 mg i.v; and Inj. Ondansetron 4mg i.v; 10 mins before surgery. Inj. Midazolam 1mg i.v and Inj. Fentanyl 1.5 μ /kg i.v administered 2 mins before surgery. All the patients were pre oxygenated for 5mins by face mask with 100%O₂. Anaesthesia was induced with Inj. propofol 2mg/kg i.v. On disappearance of eyelash reflexes and after confirmation of ventilation muscle relaxant Inj. Succinylcholine 1mg/kg i.v was administered and patients were ventilated. In group I patients the airway was secured using I-Gel of appropriate size (size 4 for adult patients weighting 60-90 kg and size 3 for adult patients weighting 30-60 kg), while in group P patients airway was secured with using proseal LMA of appropriate size by digital method. (size 3 for adults weighing 30-50kgs and size 4 for adults weighing 50-70kgs)

Proper placement of either of the devices was confirmed by:

- B/L equal air entry
- B/L equal chest movements
- Absence of gastric insufflations over the epigastrium
- No audible leak
- Capnography tracing

If first attempt remained unsuccessful, 2nd attempt with same device was repeated, maximum three attempts were tried before going for endotracheal tube insertion. Total number of attempts for I-gel /PLMA was recorded in both the groups. Nasogastric tube was inserted in all the patients. Hemodynamic parameters like heart rate, systolic and diastolic blood pressure as well as percentage oxygen saturation and end tidal CO₂ were recorded before, during and after induction and after IGEL / PLMA insertion at 5, 10, 15, 20, 30, 45, 60 minutes during course of surgery, at the time of removal and in the post

operative period. Anaesthesia was maintained with O₂, N₂O and Isoflurane and neuromuscular agent inj. Vecuronium Bromide 0.1g/kg. Reversal was achieved using inj. Neostigmine 0.05mg/kg + inj. Glycopyrrolate 8-10µg/kg given intravenously. After completion of surgery, patients received O₂ 100% for at least 5mins, I GEL /PLMA were removed when patients were awake (responding to verbal commands with adequate tidal volume and good tone). Presence of any staining on the device and any lip /tongue injury was noted. Airway related complications (laryngospasm, bronchospasm, coughing) were recorded.

Following observations were done :

1. **Effective airway time** (time from picking up of device to time of confirmation of bilateral equal air entry by mechanical ventilation)
2. **Ease of insertion of device** (Defined as insertion within the pharynx without resistance in a single maneuver.)
 - **Easy :** when device was inserted with ‘no or minimal resistance’.
 - **Difficult:** when device was inserted with significant resistance or impossible to pass without excessive force
3. **Number of attempts of insertion of each device.**
4. **Number of attempts of insertion of nasogastric tube.**
5. **Heart rate, blood pressure, SPO₂, EtCO₂ before and after induction and throughout surgery.**
6. **Post operative complications like**
 - Bronchospasm / laryngospam
 - Tongue, Lip and dental trauma
 - Complaint of sore throat
 - Nausea/Vomiting

Statistical Analysis:

The results of the study were tabulated and statistically compared. All the qualitative data were analysed using Chi- square test and quantitative data using students unpaired t-test. Results were expressed as Mean±SD. ‘p’ value ≤0.05 taken as statistically significant and

values ≤ 0.001 were taken as statistically highly significant.

RESULTS

The two groups were comparable to each other w.r.t. age, weight, gender and ASA physical status.

Table 1: Assessment

Parameter		Group I	Group P	P value
Effective Airway Time (seconds)		17.63 ±1.15	30.43 ±2.67	< 0.001
No. of Attempts	1 st attempt	28 (93.33%)	27 (90%)	> 0.05
	2 nd attempt	02 (6.66%)	03 (10%)	> 0.05
No. of Attempts of RT Insertion	1 st attempt	28 (93.33%)	27 (90%)	> 0.05
	2 nd attempt	02 (6.66%)	03 (10%)	> 0.05

Table 2: Post Operative Complications

Parameter	Group I	Group P	P value
Coughing / Sore throat			
NIL	30 (100%)	28 (93.33%)	>0.05
Transient Laryngospasm /Bronchospasm	00	02 (6.66%)	>0.05
NIL	30 (100%)	30 (100%)	>0.05
Partial	--	--	--
Total Tongue / Lip / Dental trauma			
NIL	30 (100%)	30 (100%)	>0.05
Present	--	--	--
Staining of device	--	--	--
NIL	30 (100%)	30 (100%)	>0.05
Present	--	--	--

The effective airway time in Group I was **17.63 ± 2.22seconds** and in Group P was **30.43 ± 2.67seconds**, ‘ P ’ value < **0.001**. It was

statistically highly significant. The total number of attempts for insertion of IGEL (28/2) and PLMA (27/3) was comparable in both Groups. The total number of attempts for ryles tube insertion via I-gel and PLMA was also comparable in both the groups. On inter as well as intra group comparison the changes in the mean heart rate, blood pressure both systolic and diastolic, oxygen saturation and end tidal CO₂ concentration showed no statistical significant difference.

DISCUSSION

Supraglottic airway devices are developed with increasing frequency following the overwhelming success of the laryngeal mask airway(LMA). To overcome the sympathetic stimulation caused by laryngoscopy and intubation today a wide variety of supraglottic airway devices are available which are used to protect the airway in both elective as well as emergency situations. I-gel airway is recently introduced supraglottic airway device without an inflatable cuff for maintaining the airway during spontaneous or intermittent positive pressure ventilation with potential advantages and stability after insertion in comparison to other devices. An observational study conducted by B.Richez, L.Saltel et al² evaluated I-gel in 71 women. They found insertion success rate of 97% and insertion was easily performed at first attempt in every patient. The gastric tube was inserted in all patients easily. Only 1 patient had coughing and mild sore throat. Another study carried out by Parul Jindal, Aslam Rizvi and JP Sharma⁸ on 75 patients undergoing elective surgical procedures under general anaesthesia using three supraglottic airway devices I-gel,SLIPA and LMA; suggests that, I-gel effectively conforms to the perilaryngeal anatomy despite the lack of an inflatable cuff, it consistently achieves proper positioning for supraglottic ventilation and causes less hemodynamic changes, as compared to other supraglottic airway

devices. Ishwar Singh, Monica Gupta, Mansi Tandon et al⁹ carried out a study on 60 adult patients of either sex who were divided to receive I-gel or LMA – ProSeal. They concluded that I-gel is a novel supraglottic device with an acceptable airway sealing pressure, is easier to insert, requires less attempts of insertion, has easier gastric tube placement and is less traumatic as compared to LMA-ProSeal. Thus we decided to undertake this study to compare two different supraglottic devices I-gel and PLMA for maintenance of airway in adult patients. In our study the two groups are comparable to each other with respect to age, sex, height, weight and ASA status, and type of surgery. In our study the Effective airway time was 17.63 ±2.22 seconds in Group I and in Group P it was 30.93 ± 2.67 seconds.(p<0.001) This highly significant difference in effective airway time is because IGEL does not have an inflatable cuff and has a buccal cavity stabilizer, which provides good stability and facilitates insertion without even using finger to guide the device into mouth of patient. The smooth contiguous surface, allows the device to slide potentially along the hard palate, pharynx and into hypopharynx easily.⁷ Both the devices were easily inserted and number of attempts for insertion of device as well as Ryles tube were comparable in both the groups. In I-gel the epiglottic ridge at the proximal end of mask catches the base of the tongue thus prevents the device from moving and so contributes to potential stability of the device after placement. Due to this, tip of I-Gel will be located in the upper oesophageal opening, providing conduit via oesophagus and stomach. No significant hemodynamic or respiratory alterations were observed in any of the groups due to the least effect of the devices on sympathetic stimulation at the time of insertion. Coughing and sore throat occurred in two patients of group P. None of the patients in

group I reported sore throat. No other complications were observed in both the groups. Thus, I-Gel supraglottic airway device resulted in lower incidents of throat complaints than PLMA.¹²

CONCLUSION

From our comparative study between I-Gel and PLMA insertion ; we can say that the Effective airway time is significantly less with I-gel than PLMA,both the devices can be easily inserted without any significant changes in the hemodynamic and respiratory parameters and without any significant post operative complications. Thus I-gel airway is an acceptable alternative supraglottic airway device to PLMA for short surgical procedures.

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ORIGINAL ARTICLE

Study of efficacy and safety of intravenous Dexmedetomidine infusion as an adjuvant to Bupivacaine spinal anaesthesia in Abdominal hysterectomy

Darshna Patel^{1*}, Abdulrazak Saiyad², M.R. Upadhyay³

¹Assistant Professor, ²Ex. Resident, ³Professor and Head, Department of Anaesthesiology, Medical College, Vadodara

ABSTRACT

BACKGROUND: The present study was designed to study the efficacy of dexmedetomidine by continuous intravenous infusion on various characteristics of spinal blockade especially in terms of duration of sensory and motor blockade, post operative analgesia, sedation and various side effects. **MATERIALS AND METHODS:** Sixty American Society of Anaesthesiologists (ASA) physical status I/II patients undergoing abdominal hysterectomy under spinal anesthesia were randomized into two groups of 30 each. Twenty minutes after subarachnoid block with 3 ml of 0.5% hyperbaric bupivacaine, patients in group BD received a loading dose of 1 µg/kg of dexmedetomidine intravenously by infusion pump over 20 min followed by a maintenance dose of 0.5µg/kg/h till the end of surgery, whereas patients in group B received an equivalent quantity of normal saline. **RESULTS:** The time taken for regression of motor blockade to modified Bromage scale 0 was significantly prolonged in group BD (238±24.13 min) compared to group B (193.4±3.11 min) (P < 0.001). The duration of sensory blockade (218.4±20.99 min vs. 165.9±23.50 min) were significantly prolonged in group BD compared to group B (P < 0.001). According to Ramsay sedation score, In Group BD 3.33% of patients had sedation score of 2, 30% of patients had sedation score of 3, 56.66% of patients had sedation score of 4, 10% of patients had sedation score of 5. In Group B all 100% patients had sedation score of 2. Time to first request for postoperative analgesic was prolonged in groupBD than in group B (P < 0.001). **CONCLUSION:** Intravenous dexmedetomidine significantly prolongs the duration of sensory and motor block of bupivacaine spinal anesthesia. It also provides excellent intraoperative sedation and postoperative analgesia.

Keywords: Intravenous Dexmedetomidine infusion, hyperbaric bupivacaine, intrathecal, Ramsay sedation scale, spinal anaesthesia

INTRODUCTION

Spinal anaesthesia is a commonly used technique in anaesthetic practice for gynaecological, Lower abdominal, pelvic and lower limb surgeries. Bupivacaine is appropriate for procedures lasting for two to two and half hours. If the duration of surgery prolongs, it may have to be converted in to general anaesthesia or supplemented with an intravenous anaesthetic agent. To overcome

this problem, various adjuvants like epinephrine, phenylephrine, adenosine, magnesium sulphate, sodium bicarbonate, neostigmine and alpha2 agonists like clonidine, Dexmedetomidine have been used intrathecally^[1]. Clonidine is an alpha-2 adrenergic agonist used by several routes, including oral, intramuscular and intravenous. Most studies have been performed injecting clonidine mixed with neuraxial local anesthetics^[2,3,4,5]. Rhee and co workers^[6] were the first clinicians that demonstrated that administration of intravenous Clonidine prolong Bupivacaine spinal anaesthesia.

*Corresponding Author

Dr. Darshna D. Patel
202, Vaidehi Residency, 44/1, Arunoday
Society, Alkapuri, Vadodara-390007
Email: dr.darshna1968@yahoo.com

Dexmedetomidine is the most recent agent in this group. It is eight times more specific for alpha-2 adrenoreceptor than clonidine. (Ratio of α_2 : α_1 , activity 1620: 1 for Dexmedetomidine and 220:1 for clonidine). Few studies have shown the efficacy of intravenous (IV) dexmedetomidine in prolonging prilocaine/ bupivacaine/ropivacaine spinal anesthesia in addition to providing good sedation and postoperative analgesia. The present study was designed to evaluate the effect of IV dexmedetomidine on spinal anesthesia with 0.5% of hyperbaric bupivacaine.

MATERIALS AND METHODS

After obtaining approval from the institutional ethics committee and written informed consent from the patients, 60 female patients scheduled for Abdominal hysterectomy under spinal Anaesthesia meeting the following selection criteria were included in the study.

Inclusion criteria:

- Patients posted for abdominal hysterectomy.
- Age 25-60 years.
- ASA Status – I & II.

Exclusion criteria:

- Patients unwilling to participate in study.
- Patients with bleeding disorders.
- Patients having local infection of back & spine.
- Patients with vertebral column anomalies.
- History of hypertension, morbid obesity, severe hepatic, renal, endocrinal, neurologic, gastrointestinal & cardiac dysfunction.
- History of Allergy to study drug used.
- Patients on ACE inhibitors, α_2 -adrenergic receptors antagonists, Ca channel blockers.

All the patients underwent a thorough pre anaesthetic check up. The following investigations were performed: Haemogram, Urine examination, RBS, and Chest X-Ray. Additional investigations were carried out as per requirement. The patients were explained

about the plan of anaesthetic procedure, pain assessment with the help of VAS (visual analogue scale). Tab Ranitidine 150 mg and Tab Diazepam 10 mg was given to all patients the night before the surgery. After confirming nil by mouth status, patients were taken to operation theater. Multipara vital monitor was attached and preoperative pulse rate, blood pressure and oxygen saturation were recorded. All the patients were premedicated with inj. Glycopyrrolate 0.2 mg IV and inj. Ondansetron 4 mg IV. All the patients were preloaded with inj. Ringer lactate 10ml/kg of body weight, 30 minutes prior to subarachnoid injection of drug.

Preparation of Dexmedetomidine infusion:

Under all aseptic and antiseptic precautions two ml of Inj. Dexmedetomidine (one ampoule contain 2ml, 100microgram per ml) withdrawn in 50 ml syringe and diluted with 38 ml of normal saline, Total 40 ml volume prepared (5 microgram per ml). Syringe was loaded on syringe infusion pump and connected to patient through Iv extension set. Pre setted with dose of 1 micro gram/kg. Under all aseptic and antiseptic precautions, lumbar puncture was performed in lateral position in L3-4 space by midline approach with 23G disposable spinal needle. Patients were randomly allocated in to two groups. **Group BD (n = 30)** Inj. Bupivacaine 0.5% 3 ml intrathecally followed 20 minutes later by Inj. dexmedetomidine loading dose 1 μ g/kg IV in 20 minutes and then 0.5 μ g/kg/hr maintenance dose till completion of surgery. **Group B (n = 30)** Inj. Bupivacaine 0.5% 3 ml intrathecally followed 20 minutes later by Inj. Normal saline initially the loading dose and later maintenance dose, the volume being the same as it could have been in case of Dexmedetomidine infusion, till the end of surgery. The following parameters were observed.

1. **Onset of sensory block:** Immediately after spinal injection, patients were checked for loss of pin prick sensation at

L1 dermatome. That time was taken as onset of sensory block.

- 2. Duration of sensory block:** Time interval from onset of sensory block to regression of sensory level to L1 dermatome again.

Motor Block:

Motor block was noted as per Bromage scale which is as follows: Grade 0 - no motor blockade, Grade I - unable to flex hip, Grade II - unable to flex knee and Grade III - unable to flex ankle Following things were observed in motor block:

- 1. Onset of motor block:** Time interval from intrathecal injection to achievement of motor block of Bromage Grade -I
- 2. Duration of motor block:** (Time interval from onset of motor block to regression of motor block to Bromage grade 0)

The level of sedation was graded with the help of Ramsay sedation score as shown below. (**Grade 1:** patient anxious, agitated, or restless; **Grade 2:** patient cooperative, oriented, and tranquil alert; **Grade 3:** patient responds to commands; **Grade 4:** asleep, but with brisk response to light glabellar tap or loud auditory stimulus; **Grade 5:** asleep, sluggish response to light glabellar tap or loud auditory stimulus; and **Grade 6:** asleep, no response). Vital parameters were recorded (heart rate, blood pressure, SpO₂, respiratory rate) before giving block and then at 1,3,5,10,15,20,25,30 and 45 minutes after giving the block. Then every 15 min till the end of surgery. Post operatively patients were monitored for vital parameters, sensory level, motor level, sedation score and pain assessment initially at 30 min interval for four hours and then at one hour interval till VAS score of ≥ 4 . Inj Diclofenac Sodium 1.5mg/kg Intramuscularly was given when VAS score $\geq 4/10$ or when patient demands. Total duration of effective analgesia was counted from onset of sensory block to when VAS score of four or more. Patients were monitored for various intra and post operative

complications which are as follows: Hypotension: defined as systolic blood pressure $<20\%$ of pre-procedure value. Inj ephedrine 5mg IV bolus to be given when hypotension occurs. Bradycardia: defined as pulse rate less than 20% of preoperative value. It was treated with Inj Atropine 0.6mg IV bolus. Respiratory Depression: defined as respiratory rate less than 10/min or oxygen saturation less than 90% . It was to be treated with oxygen if required. Patients were also observed for Heavy sedation (sedation score ≥ 4), Nausea and Vomiting, Dryness of mouth and Shivering.**Sample size calculation:** With reference to the study mentioned in bibliography^[8], the mean values of differences seen in the duration of analgesia between the dexmedetomidine group and placebo group was 208 minutes and 137 minutes respectively. With the help of Med Cal C software, considering type-I(alpha) error as 0.05 and type-II(beta) error as 0.20, sample size came to be 27 in each group. So we had selected 30 patients in each to further authenticate the study and minimize errors .Randomization was done by sealed envelope method.(Reference: Medical statistics 4th edition text book for the Health sciences by Michael J. Campbell) **Statistical Analysis:** The results of the study were tabulated & statistically compared among the two groups. ‘**Chi square test**’ was used for **qualitative data** (ASA grade, Motor Grade). Heart rate, blood pressure and oxygen saturation over time within the groups were compared by ‘**Paired t test**’ .For rest of the quantitative data, ‘**Student t test**’ (unpaired) was used. The **p-value** was considered significant as shown below: $P > 0.05$ not significant, $P < 0.05$ significant, $P < 0.001$ highly significant

RESULTS

The two groups were comparable to each other with respect to age, weight and ASA physical status (**Table-1**). As shown in **Table-2** Patients belonging to group B had shorter duration of

sensory block [165.9±23.50 minutes], than Group BD [218.4±20.99 minutes] with a statistically highly significant difference (P <0.001)

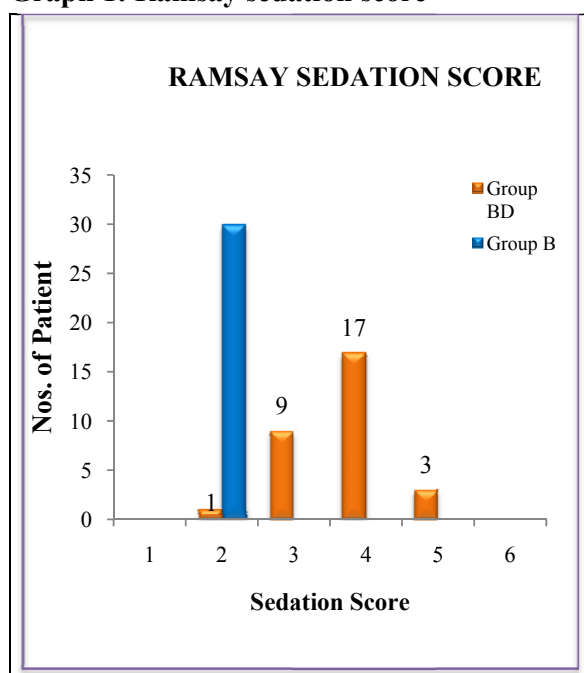
Table 1: Demographic Data

Group		Group BD	Group B	P value
Age in years (Mean ±SD)		39.66±6.00	41.6±6.35	>0.05
Weight (kg)		52.33±9.62	52.26±9.55	>0.05
ASA	I	17	15	>0.05
	II	13	15	
Mean duration of surgery (minutes)		88.9±22.35	89.32±19.85	>0.05

Table 2: Comparison of duration of sensory & motor blockade

Parameter	Group BD	Group B	P value
Time to regression of sensory block to L1(minutes)	218.4±20.99	165±23.50	<0.001
Duration of Motor Block (minutes)	238±24.13	193.4±3.11	<0.001

Graph 1: Ramsay sedation score



Patients belonging to Group BD had duration of motor block of 238±24.13 minutes and Group B had duration of motor blockade of 193.4±3.11 minutes. This difference was also statistically highly significant p <0.001. **Graph-1** shows the sedation score in both Groups during intra-operative period.

Graph 2: Changes in mean pulse rate

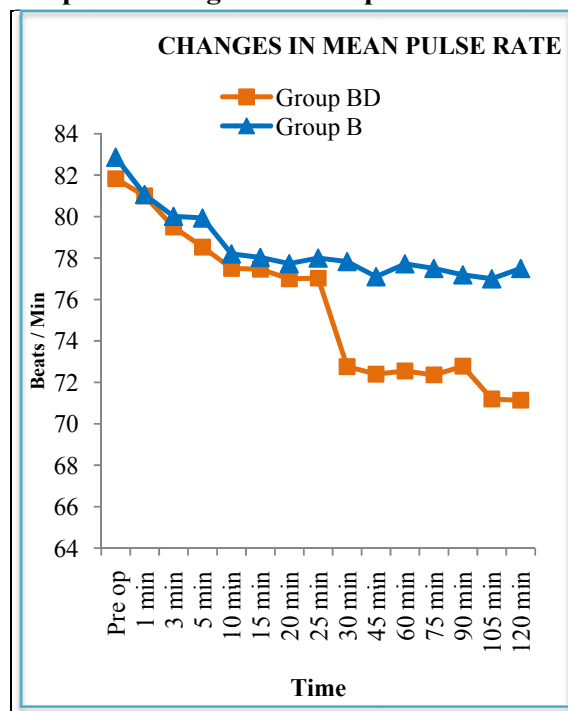


Table 3: Mean duration of effective analgesia

Time period	Group BD	Group B	P Value
Mean Duration Of effective analgesia (minutes)	358.26±97.39	221.06±72.41	<0.001

Table 4: Intraoperative Complications

Parameter	Group BD		Group B	
	No	%	No	%
Nausea and vomiting	00	0	01	3.33
Hypotension	06	20	05	16.66
Bradycardia	04	13.33	02	6.66
Heavy Sedation	20 [Sedation score ≥4]	66.66	00	0
Dry Mouth	03	10	00	0

In Group BD 3.33% of patients had sedation score of 2, 30% of patients had sedation score of 3, 56.66% of patients had sedation score of 4, 10% of patients had sedation score of 5. In Group B all 100% patients had sedation score of 2. **Graph-2** shows the changes in mean pulse rate in both the groups after spinal anaesthesia. Decrease in pulse rate was highly significant 30 minutes after spinal anaesthesia in group BD, however it was within 20% from baseline value and so did not require any treatment. **Table-3** Shows the mean duration of Effective Analgesia. Duration of effective analgesia was lesser in Group B [221.06±72.41 minutes], when compared to Group BD [358.26±97.39 minutes] and the difference was statistically highly significant ($p < 0.001$). **Table-4** shows the intra operative complications in both the groups. In Group BD, six patients developed hypotension, four patients developed bradycardia, twenty patients developed heavy sedation and three patients developed dry mouth. In Group B, one patient had nausea vomiting, five patients developed hypotension and two patients developed bradycardia.

DISCUSSION

There are three subtypes of α_2 receptors: A, B, and C. Dexmedetomidine is a more selective α_2 -A receptor agonist than clonidine, with more sedative and analgesic effects. Activation of presynaptic α_2 -A receptors at locus ceruleus decreases norepinephrine release and causes sedative and hypnotic effects, whereas its effect on descending medullo spinal noradrenergic path way results in analgesia by terminating pain signal propagation. At substantia gelatinosa of the spinal cord, it decreases firing in nociceptive neurons and release of substance P, thus producing analgesia. The mean duration of effective analgesia was lesser in Group B [221.06±72.41 minutes], when compared to Group BD [358.26±97.39 minutes] and the difference was statistically highly significant ($p < 0.001$). In

our study, the mean time for two-segment regression of sensory blockade was significantly prolonged in the dexmedetomidine group (218.4±20.99 min) compared to the control group (165±23.50 min). Jorm et al [6] found that Dexmedetomidine has an inhibitory effect on the locus ceruleus (A6 group) located at the brain stem. This supraspinal action could explain the prolongation of spinal anaesthesia after intravenous administration of dexmedetomidine. Roberto T. sudo et al (2003) [7] also reported that the systemic administration of dexmedetomidine significantly increased the duration of spinal anesthesia induced by levobupivacaine. Similar observations were noted by others [Al Mustafa et al. [1] 261.5 ± 34.8 min vs. 165.2 ± 31.5 min ($P < 0.05$), Whizar-Lugo et al [8] 208 ± 43.5 min vs. 137 ± 121.9 min ($P = 0.05$) in the dexmedetomidine and control groups, respectively, Tekin et al. [9] 148.3 min vs. 122.8 min ($P < 0.001$) in the dexmedetomidine and control groups, respectively]. In our study, the regression time to reach the modified Bromage scale 0 was significantly prolonged in the dexmedetomidine group (238±24.13 min) compared to the control group (193.4±3.11 min). Similar prolongation of motor blockade was reported in previous studies [Al Mustafa et al. [1] 199 ± 42.8 min vs. 138.4 ± 31.3 min ($P < 0.05$), Whizar-Lugo et al. [8] 191 ± 49.8 min vs. 172 ± 36.4 min (P value not significant), Tekin et al. [9] 215 min vs. 190.8 min ($P < 0.001$) in dexmedetomidine group and control group, respectively]. Dexmedetomidine does not appear to have any direct effects on the heart [10] A biphasic cardiovascular response has been described [11,12,13]. The administration of a bolus of 1µg/kg initially results in a transient increase of the blood pressure and reflex decrease in heart rate [12]. The initial reaction can be explained by the peripheral α_2B adrenoceptor stimulation of vascular smooth muscle and can be attenuated by a slow

infusion over 10min or more minutes. We did not find any increase in blood pressure as we infused the loading dose of dexmedetomidine over 20 minutes. The initial response lasts for 5-10 minutes and is followed by a decrease in blood pressure and a stabilization of the heart rate, below baseline values. Both of these effects are caused by the inhibition of central sympathetic outflow. Activation of post-synaptic α_2 -A receptors in CNS results in hypotension and bradycardia by decreasing the sympathetic activity^[13]. Dexmedetomidine does not cause significant respiratory depression despite providing good sedation resulting in wide safety margins.^[14] In the present study, there was no significant difference in the SpO₂ levels between both the groups during surgery and in the postoperative period, similar to the study results of Al Mustafa et al.^[1] In our study, intraoperative Ramsay sedation scores were significantly higher in the dexmedetomidine group as compared to the control group. Four patients in Dexmedetomidine group (13.33%) had bradycardia compared to the control group (6.66%), which is similar to the findings of other studies (Al Mustafa et al.^[1] 16.66% vs. 8.3%, Whizar- Lugo et al.^[8] 32% vs. 20% in dexmedetomidine group and control group, respectively).

CONCLUSION

Thus we conclude that Dexmedetomidine can be safely administered via intravenous infusion 20 minutes after the Bupivacaine induced spinal block. So as to achieve prolonged duration of sensory & motor block with haemodynamic stability, adequate sedation, prolonged post operative analgesia without respiratory depression.

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CASE REPORT

Case Report on renal tuberculosis-can it be diagnosed early?

Parul Vadgama^{1*}, Satyam Ghadiya², Preksha Jain³, Manish Variya⁴, A.S Pandey⁵,
Mona Shastri⁶

¹Assistant Professor, ^{2,3,4}Resident, ⁵Professor and Head, Department of Pulmonary Medicine, SMIMER, Surat

⁶Professor and Head, Department of Radiology, SMIMER, Surat

ABSTRACT

Tuberculosis of the genitourinary tract is one of the late reactivation or complications of pulmonary tuberculosis which is mostly prevalent in young adults and middle-aged people. We here report a case of Renal Tuberculosis presented to us with recurrent urinary tract infection with sterile pyuria suspected to have Renal TB at the end of 6 months. Her urine for AFB culture and biopsy turned out to be positive and was put on AntiTB treatment. We had to subject patient for Right sided nephrectomy due to extensive renal involvement. Patient was given CAT-II Anti TB treatment as she had consumed CAT-I in 1996 for Pulmonary Tuberculosis and was declared cured at end of 8 months. But after one and a half year patient had involvement of left kidney along with Left ureter and bladder and needed to be subjected for augmentation cystoplasty with ureteric reimplantation. AntiTB treatment was restarted. Patients urine sample and biopsy were sensitive to first line drugs. The diagnosis of this case was delayed because of the general impression that renal tuberculosis is rare. A high index of clinical suspicion at all times with combined investigative tools especially CT urography and AFB culture permits accurate diagnosis and prompt treatment of most cases and prevents them from being complicated.

Keywords: Renal tuberculosis, Urine culture for AFB, CT Urography, Antitubercular treatment, Augmentation cystoplasty

INTRODUCTION

According to CDC (Center for Disease Control) report, genitourinary tuberculosis comprises 12% to 18% of extra pulmonary tuberculosis (1). Out of these about 25% are known to have pulmonary TB at some stage. Due to the diverse and atypical clinical manifestations of urinary TB, the disease is easily misdiagnosed and late diagnosed. Also, prevalence of extra pulmonary TB is increasing in the recent years especially in immunosuppressed patients such as those with AIDS. Symptoms typically include dysuria, frequency and hematuria, which may be macroscopic or microscopic. Back, flank and abdominal pain may also be

**Corresponding Author*

Dr. Parul Vadgama
B101, Neelkanth Residency, Near Crossroad
Char Rasta, Kosad, Amroli,
Surat- 394107

Email: drparulvadgama1980@gmail.com

present. Following pulmonary primary infection there is a haematogenous phase where the glomerular and peritubular capillary bed of the kidneys become seeded with M tuberculosis and results in cavitation and some times autonephrectom [2,3]. Diagnosis of acute renal TB rests on three first-morning-void urine samples. An acid-fast stain and mycobacterial culture performed on urine or renal biopsy are the backbone for diagnosis. The results may also be supported by imaging findings. A plain abdominal X-ray may show enlargement of a kidney and calcification of the kidneys and lower urinary tract [3]. Computed tomography urography and intravenous pyelography are of great help to detect renal TB, any extra-renal spread and the functioning of kidney. The management of acute renal TB requires an intensive course of antituberculous drug therapy and attention of a urologist if the case

needs some type of surgical intervention in form of nephrectomy, ureteroplasty or augmentation cystoplasty.[2].

CASE REPORT

A 44-year-old female was referred to us from a private practitioner for 6 months history of recurrent urinary tract infections treated with multiple courses of antibiotics in 2009. She had history of fever, burning micturition, dysuria, urinary frequency, suprapubic pain, and bloody urine. She denied night sweats, flank or abdominal pain, cough, hemoptysis or weight loss. Physical examination demonstrated a suprapubic tenderness. Her urine report was suggestive of sterile pyuria and hematuria. Her blood pressure was normal. Her renal functions, other routine investigations and electrolytes were normal. Her HIV report was negative. She had a positive Mantoux test. Her chest radiograph was suggestive of Right pleural thickening. Patient was subjected for CT urography after taking an opinion of urologist which was suggestive of irregular right renal outline with dilated calyx and cavities with abscess formation in medulla. It was also suggestive of diffuse thickening of pelvicalyceal system and upper 2/3rd of the ureter causing luminal obliteration which was pointing towards chronic infection. The left kidney was unremarkable. Looking to the poorly functioning kidney on the basis of urography report, the decision of laparoscopic nephrectomy was taken. The biopsy of the renal and ureteric tissue was sent for histopathology which was suggestive of changes of pyelonephritis and culture for AFB which turned out to be positive for mycobacterium Tuberculosis. As patient had consumed AKT for 6 months for pulmonary TB in 1996, was put on CAT-2 under RNTCP and was declared cured on basis of negative culture reports for AFB of urine sample and improvement in symptoms. After duration of one year, in January-2010, patient presented with complains of urgency and occasional incontinence. Patient was investigated in form of urine and renal

function test. Urine was suggestive of pus cells and was given antibiotics. At that time, renal function test was normal and patient got cured with antibiotics. In August 2012, patient again presented with urgency, painless hematuria and nocturnal enuresis.

Figure 1: Pre-op CTurography: irregular right renal outline with dilated calyx and cavities with abscess formation in medulla.

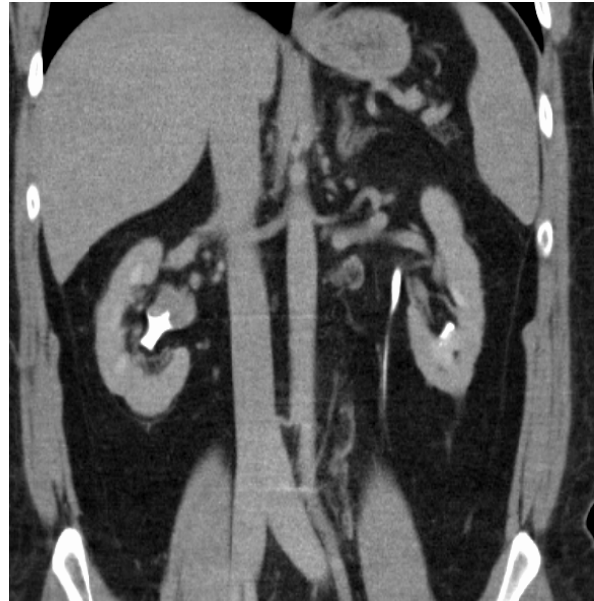


Figure 2: X-ray Chest: showing right pleural thickening



Immediately CT urography was planned which was suggestive of solitary enlarged left kidney with moderate to severe left sided hydroureteronephrosis upto its distal end at vesicoureteric junction with stricture formation.

It was also suggestive of irregular shape bladder with reduced lumen capacity and severe eccentric wall thickening with severe paravesical infiltration as a indicator of involvement of bladder with tuberculosis. X-Ray chest was same as previous.

Figure 3: Post nephrectomy CT film august 2012: Neobladder formation with lobulated margin, compensatory hypertrophy of left kidney with mild hydronephrosis and hydroureter

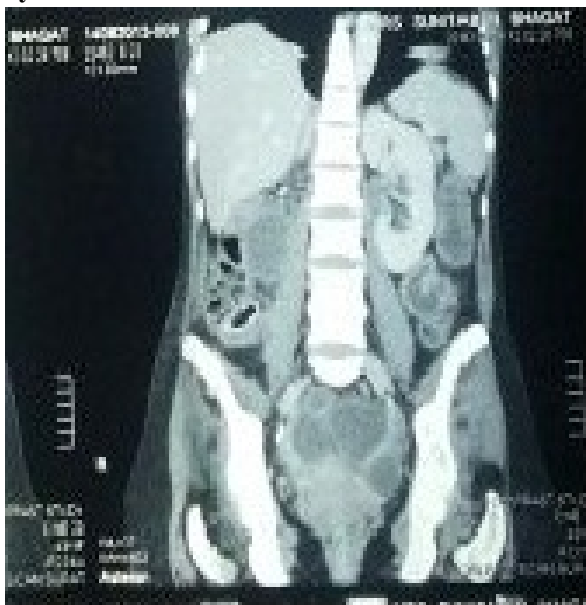


Figure 4: Post nephrectomy CT film august 2012: compensatory hypertrophy of left kidney with mild hydronephrosis and hydroureter



Her renal function was normal. Patient was subjected for left sided Percutaneous Nephrostomy(PCN) and cystoscopy. On cystoscopy, findings of CT were confirmed. Patient was discharged with Percutaneous nephrostomy and urine was sent for AFB culture and sensitivity for first line drugs. As patient was sensitive to all first line drugs, antitubercular treatment was started in form of CAT-II. Streptomycin was substituted with ofloxacin (400 mg BD) taking into consideration the presence of single kidney. After two months of Anti TB treatment patient was posted for augmentation cystoplasty with left ureteric reimplantation. Patient was also taught for self catheter training. Anti-TB treatment was extended to total duration of 1 year and stopped after negative urine AFB culture.

DISCUSSION

Although rare, clinicians still need to consider a diagnosis of renal TB in patients with previous TB exposure and recurrent Urinary tract infection with sterile pyuria not responding to routine antibiotics. Our patient's diagnosis was also delayed upto 6 months. The common manifestations of TB are fever, weight loss and night sweats. However, in urinary TB these are unusual. The clinical manifestations of urinary TB are nonspecific, including back, flank and suprapubic pain, hematuria, increased urinary frequency and nocturia. Renal TB occurs as a result of haematogenous spread following a primary infection in the lung. At the time of presentation, there is frequently no evidence of active pulmonary disease. Most patients with renal TB have chest radiographs that are either normal or show sequel of healed primary infection. Chest x-ray abnormalities are found in 52 to 75% (4). However, there may be clinical or radiographic evidence of past infection, suggesting renal involvement has reactivated after a period of dormancy. GU TB is often suspected with the finding of pyuria in the absence of isolation of a causative microbiologic organism from the urine or

biopsy material. Culture of 3 morning urine specimens for mycobacteria establishes the diagnosis in 80 to 90% of cases. Urine culture is traditionally used for diagnosis because acid-fast bacilli (AFB) smears are often negative. Compared with culture sensitivity, AFB staining is 52%, specificity is 96%. The sensitivity of urine culture is as 80-90% but it takes 10-14 days for report. (5) With a renal abnormality and negative mycobacterial urine cultures, cytologic studies, and fine-needle biopsy may be diagnostic. Laparoscopic and cystoscopic examination often aids in the diagnosis. In a study performed in India in 42 patients with a clinical suspicion of GU TB, isolation of Mtb by urine AFB culture, bladder biopsy, and urinary PCR for Mtb was 37.14%, 45.83%, and 94.29%, respectively. (6) The purified protein derivative test is a useful adjunctive test and is positive in 95% (7). Most patients with renal TB have chest radiographs that are either normal or show sequelae of healed primary infection. Chest x-ray abnormalities are found in 52 to 75% (7). Patients are often unaware of their initial pulmonary infection. Our patient had also finding of pleural blunting in X-ray chest. Abdominal Plain films may reveal calcification, a mass, or atrophy. IVP is the sensitive image modality in the early stages, where subtle irregularity of calyceal contour can be seen. With progressive illness, IVP may demonstrate areas of cavitation, which communicate with the collecting system, parenchymal necrosis, or strictures that are commonly multiple (producing a "beaded" appearance of the ureter or a rigid, short, "pipestem" ureter) (7). In more advanced disease, aside from calyceal distortion and ureteric strictures, there may be bladder fibrosis, hydronephrosis, and autonephrectomy. Ultrasound may reveal calyceal dilatation and more overt evidence of obstruction. CT is more sensitive for calcifications than urography and can image extrarenal extension of disease. CT urography is regarded as the correct imaging technique for upper urinary tract assessment,

especially renal TB. Multislice CT has made it possible to collect thin collimated data of the entire urinary tract during a single short breath hold. It provides an accurate evaluation of the amount of residual functioning parenchyma and extrarenal spread in renal TB. Early manifestation of renal TB is seen on CT Urography includes calyceal erosion (Moth eaten calyx) with progression towards medullary or papillary necrosis (8,9). The CT characteristics of active ureteral involvement are typically seen as regions of marked periureteric thickening or fibrosis (10). The differential diagnosis includes chronic pyelonephritis, papillary necrosis, medullary sponge kidney, caliceal diverticulum, renal cell carcinoma, transitional cell carcinoma and xanthogranulomatous pyelonephritis [2]. The management consists of Anti TB treatment as of in other extrapulmonary TB cases under RNTCP according to the sensitivity pattern. The operative decision of nephrectomy should be made in consultation with a nephrologist in cases of non functioning kidney especially when there is uncontrolled hypertension. (5) It is also possible that unilateral surgical tuberculosis, when not operated for in time, may spread to the bladder by way of the ureter, from here again an ascending infection via the other ureter to the healthy kidney leading to a secondary bilateral renal tuberculosis. Nephrostomy and Double J stenting are other modalities of treatment. The ureter should be reimplanted into the bladder as soon as possible. If the bladder tuberculosis still exists the ureter can be reimplanted into skin or the rectum or to perform a nephrostomy.

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