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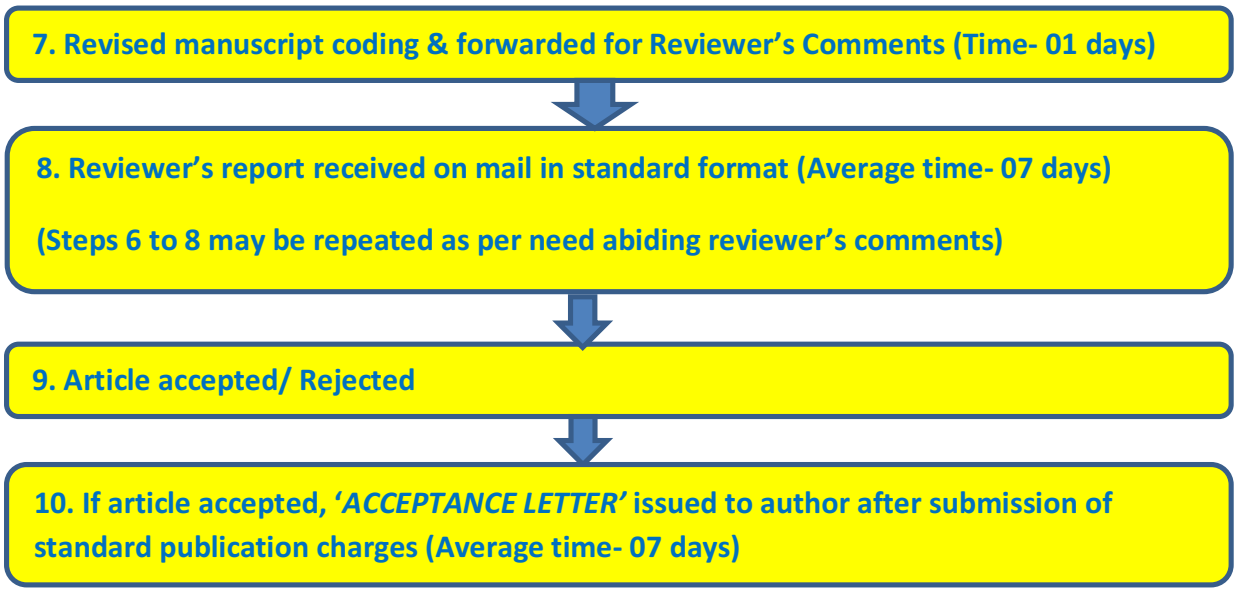

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Editorial

Forensic Medicine and Development of Sub-specialities

Mandar Karmarkar[a*]
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Dear Colleagues,

Forensic Medicine is a subject existing since time immemorial, it may not be with the same nomenclature. The word 'forensic' is derived from the Latin word 'forensis' pertaining to forum. It is said that Imhotep, the grand Vizir, Chief Justice and Chief Physician to King Zoser of Egypt is considered to be the first medico-legal expert (2655-2600 BC). Forensic Medicine has evolved since the times of Imhotep and today even Toxicology is part of Forensic Medicine.

The scope of the subject is actually vast but for some reasons the subject has been limited to autopsy. There are ample opportunities to develop sub-specialties in forensic medicine and toxicology. Forensic histopathology, clinical forensic, toxicology, forensic anthropology, forensic dentistry, crime scene investigation and disaster management to name a few. The problem with our faculty is that we are stuck with only medico-legal autopsies. The growth of sub-specialties in our subject will help for the progress of the subject in future. It will result in better training of the undergraduate and postgraduate students and will also create more job opportunities in the subject.

Development of clinical forensic medicine will help in training of undergraduate and post graduate student that will further result in Indian Medical Graduate being aware of the various medico-legal aspects of hospital practice. Cases of injury, sexual assault, poisoning, burns, RTA are routine cases that report to Emergency Medicine Department of any hospital. The role of medico-legal expert is vital in such cases with regards to injury certification, dying declaration, consent, preservation of samples. The clinicians are ignorant about these aspects and also reluctant to do medico-legal work. The forensic faculty can definitely handle this aspect of clinical practice.

Toxicology is another neglected area in Forensic Medicine. The Indian Society of Toxicology under the guidance of Dr. V.V. Pillay is doing pioneering work for establishment of toxicology labs. There is need of toxicology labs at every medical college with increasing number of cases of poisoning in our country. The lab will not only help in saving lives but also in creating a separate identity for FMT fraternity.

Forensic dentistry is another sub-specialty that can be developed in all departments. In coordination with dental college, faculty from FMT can undergo training in medico-legal aspects of dentistry. All of us are aware that teeth play a vital role in identification, poisoning and are probably the few biological remains to survive in mass disaster.

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With technological advances in the field of dentistry, medical records will be available for comparison and chances of teeth being one of the remains in any type of crime are high. Forensic anthropology is another sub-specialty that requires development. There are many colleges that have started short courses in this subject. A proper training and certification in anthropology will definitely add to the work profile of the subject.

Disasters are not new to Forensic Medicine e.g. bomb blast, earthquakes, floods etc. In cases of mass disasters segregation of human remains for proper identification is the most important aspect for investigation. Identification of human remains and establishing identity is an enormous task that can be handled by Forensic faculty trained to do so. Handing over the remains to the relatives is also a difficult and emotional task. In such cases if forensic person has additional training in dentistry, evidence collection and communication skills then the job becomes much easier.

Crime scene investigation is another aspect which a medico-legal expert is required to do in some cases but there is hardly any training available for this. Usually a junior person follows the senior whenever he is called to the scene of crime by police. There is no standardized training in this aspect of investigation. There are fellowships available in foreign countries for this. If this can be developed it will go a long way in crime investigation.

There is ample scope for private medico-legal practice in various corporate hospitals. Considering the growth of private health sector in India there will be need for medico-legal experts also. The current situation in India is such that there is erosion of trust in Doctor-Patient relationship and lot of cases are being filed in consumer courts and criminal courts against doctor. There is definitely scope for Forensic expert in private health sector. The various laws like PCPNDT, CPA have made the medical fraternity vulnerable.

There is scope for further development of the subject but there should be desire and dedication to develop these sub-specialties. With development of these sub-specialties not only the scope of the subject will increase but there will be ample opportunities for the young doctors joining this subject. All the specialties in medicine are developing their own sub-specialties and it is time we wake up to the need of the hour otherwise our subject will be like a relic of the past. I hope the young medico-legal experts take up this challenge.

Some important links-

1. Indian Society of Toxicology- www.indiansocietyoftoxicology.org
2. **Forensic anthropology course**- www.yenepoya.edu.in
3. Commonwealth medical fellowships- http://cscuk.dfid.gov.uk/apply/medical-fellowships/
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Original Research Article

Autopsy based Study of Fatal Snake Bites In Kolhapur Region

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Article Info

Key words
Snakebite
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Abstract

Deaths resulting from snake envenomation are a public health problem particularly in rural India. Varieties of venomous snakes inhabit in India which take thousands of human lives every year. The present study has been done to ascertain the specific patterns of snakebite and factors contributing to the outcome of such cases. This is a 2 years retrospective analysis and demographic study of cases of fatal snake envenomation presenting to the mortuary of Government Medical College & Hospital, Kolhapur, from January 2016 to December 2017. The purpose of this study is to present the epidemiological pattern of snake poisoning in this region, In our study, 42 cases of death due to snakebite were brought for medico legal post mortem examination to the Department of Forensic Medicine & Toxicology. Of these, maximum number of cases, i.e. 22, belonged to the age group of 31-60 years; The months of the rainy season, i.e. July & August, accounted for the maximum no. of cases i.e. 21. The most common area of bite were the lower limbs (83.3%). The most common type of envenomation was neurotoxic (52.3%) & Respiratory failure (40.47%) was the most common cause of death

1. Introduction

Snakebite is an injury caused by the bite of a snake, especially a venomous snake. Snakebite is a significant and serious medico-legal issue in major parts of the world, especially in South Asian countries. It has been predicted that 5 million snake-bite cases occur worldwide every year, causing about 100,000 deaths.[1] The World Health Organization (WHO) estimates that there are about 2.5 million venomous snakebites recorded per year, 5% of which prove fatal. Nearly 1, 00,000 of these deaths occur in Asia and approximately 20,000 in Africa.[2]

According to the literature, in India, 81,000 cases of snakebite with 11,000 deaths are reported every year, making it the most heavily affected country in the world.[3] There are about 276 species of snakes in India, of which 62 are venomous, the rest being non-venomous. Among the venomous species, 20 are aquatic snakes and 42 are terrestrial snakes, with most of them having very limited distribution. Only four venomous species are known for the vast

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of snake bites and associated mortality and morbidity.[4] These are named the "Great Four" - Common Krait, Cobra, Russell's viper and Saw Scaled Viper.[5] Snake bites usually result from an unfortunate accidental interaction between a snake and a human victim.

It occurs frequently when the people are at work like cultivation, gardening, plantation, wood collection, watching the crops even during walking.[6] Hence, the objectives of this study are to highlight the epidemiological & demographic factors & the patterns of deaths due to snakebite in and around Kolhapur district. The study of the profile and pattern of snakebite is necessary to provide pertinent information to the physicians in order to manage snakebite appropriately.

Materials & Methods

The current retrospective study is carried out in Forensic Medicine Department, RCSM Government Medical College & CPR Hospital Kolhapur for a period of 2 years from January 2016 to December 2017. The Patients with history of snakebite and admitted at this tertiary health care institution are included in this study. The sample consists of all fatal snake bite cases examined at forensic autopsy during the routine medico-legal post-mortem. The series included autopsy examination of 42 cases of fatal snake bite in our hospital- based study.

The snakebite victims were analysed on the basis of hospital records, police inquest report, information from relatives and post-mortem findings. At the time of hospital admission, a case history regarding the time of snakebite, type of snake, site of snakebite, the signs and symptoms, and any first aid measures were enquired. The history and the findings were recorded in a specially designed proforma. A detailed review of the first information report, post mortem report and medical records were done to collect the information regarding the incidence and determinants of snakebite related mortality with reference to sex, age, occupation, season, time, place, site of bite, envenomation type and hospital treatment history prior to the death and cause of death were recorded. The data was analysed.

Results

A total of 3520 autopsies were conducted during the study period, amongst 42 (1.29%) fatal snakebite cases were reported (refer to **Table 1**). Maximum number of fatal snakebite cases occurred in the year 2017 (25 cases). In relation to sex 66.6% were males and 33.3% females, the vulnerable age group among both men and women were those in the 31- 60 years age group (52.3%), (refer to **Table 2**).

Table 1: Profile of fatal snake bites among autopsy conducted during study Period

Year	No of Post Mortem conducted	Total fatalities due to snakebite
2016	1685	17
2017	1835	25
Total	3520	42

Table 2: Age and Sex wise distribution of cases

Age (Years)	Male	Female	Total	Percentage
0-18	3	2	5	11.90
19-30	6	3	9	21.42
31-60	15	7	22	52.38
> 61	4	2	6	14.28
Total	28	14	42	100

Table 3: Occupation wise distribution of cases

Occupation	Frequency	Percentage
Farmers	23	54.76
Labourers	11	26.19
Homemakers	5	11.90
Children	3	7.14
Total	42	100

Table 4: Distribution of cases based on season

Season	Frequency	Percentage
Summer season (Feb to May)	13	30.95
Rainy season (Jun to Sep)	21	50
Winter season (Oct to Jan)	8	19.04
Total	42	100

By occupation, 54.7% were farmers, 26.1% were labourers, 11.9% were homemakers and 7.1% were children (refer to **Table 3**). In relation to season (refer to **Table 4**), maximum number of deaths reported during

rainy season (50%) followed by summer (30.9%). The peak incidence of snakebite occurred during night hours (40.4%) (refer to **Table 5**).

Table 5: Distribution of cases based on time of occurrence

Time of Occurrence	Frequency	Percentage (%)
Morning	5	11.90
Afternoon	12	28.57
Evening	8	19.04
Night	17	40.47
Total	42	100

Table 6: Distribution of case based on site of bite

Site of bite	frequency	percentage
Head & Neck	2	4.76
Upper Limb	5	11.90
Lower Limb	35	83.33
Trunk	0	0
Total	42	100

Table 7: Distribution of case based on cause of death

Enveno-mation	Cause of death	Freq-uency	%	Total %
Neuro-toxin	Respiratory Failure	17	40.47	52.37
	Neurogenic shock	5	11.90	
Vasculo-toxic	Haemorrhagic shock	7	16.66	47.61
	Multiorgan failure as result of DIC	13	30.95	
	Total	42	100	100

The lower limb (83.3%) was the most common site of bite (refer to **Table 6**). The most common type of envenomation was neurotoxic (52.3%). respiratory failure (40.4%) was the most common cause of death followed by multi organ dysfunction (30.9%) and haemorrhagic shock (16.6%), (refer to **Table 7**).

Discussion

A death due to snake envenomation is a public health problem particularly in rural India. The accurate database of snake-bites in rural areas is at necessity in spite of lack in certainty due to the well known facts like difficulty in the accessibility to health care, treating by quacks, lack of proper reporting system and death occurring outside health care facilities. The present study provides valuable information on epidemiological factors of snake bite in this region, also the consequences of delay in management of these cases. In the present retrospective descriptive study, all fatal cases of snake bite autopsied during January 2016 to December 2017 were included, a total of 3520 autopsies were conducted during the study period and amongst, 42 cases were fatal snakebite cases. Table 1, shows increase in the rate of incidence every year towards the maximum number (59.52%) of cases in the year 2017. In the present study the highest incidence of deaths due to snake bite was found in the age group of 31 to 60 years of life, which was consistent with the studies conducted by other authors. The reason for the maximum involvement of the young population is that they form the productive age group population & more commonly social and are involved in outdoor activities and are therefore more likely to get exposed to snakes.

The occupations of the majority of the cases in our study were farmers (54.7%), followed by labourers (26.1%), homemakers (11.9%), children (7.14%) and 50% of snakebite fatalities occurred during rainy season, i.e. in the month of June to September followed by summer season (Table 4). Aramani CS et al.[7] Sreekrishnan TP, et al [3] and Kumar, et al [8] in his study quoted that snake bites and snake bite fatalities peak during the monsoon season, probably reflecting agricultural activity, flooding, increased snake activity, and abundance of their natural prey.[7] In the present study, lower limbs (foot and legs), were the most common body parts which were involved in snakebite cases (83.3%), which is consistent with the previous studies.[3,8,9,10-12] However it is as well known fact the majority of the rural population in India is dependent on the farming. Hence adults and children are often employed in the farm fields in early hours during raining season. Snakes tend to get attracted to agricultural areas, such as paddy fields, where they can find abundant food sources, such as

rodents, which results in increased risk of making contact with snakes and this coupled with bare foot walking in the fields makes foot an easy accessible area for snake bite. All these studies have been conducted in regions where a major population, belonging to the rural area had been working in the fields, during the early morning or late evening hours when visibility is minimal.[4,8,9,12] Thus, snakes could have possibly been trodden upon by the victims. In our study, the most common type of envenomation was neurotoxic (52.37%).Respiratory failure (43.5%), was the most common cause of death followed by, multi organ dysfunction (30.9%) consequent upon disseminated intravascular coagulopathy. In a study by Kumar AGV et al.[13] the most common type of envenomation was neurotoxic (76.5%) and cause for death was respiratory failure.

Conclusion

Snakebite is invariably an accident. As it is an accident, it can be avoided in many cases, but need some judicious, timely precautions to avoid the risk of snakebites. Education of the rural society and proper awareness programmes to be implemented regarding the safety measures to be adopted and the rapid transport of victims to tertiary health care centres must be encouraged.

This helps to curtail many numbers of fatal incidences. Still due the lack of knowledge and awareness among the public, the effort of government is going in vein in reducing deaths due to snake bite. So creating awareness and knowledge through media, street plays, or by educators/health workers, NGO's etc. may help to reduce such cases.

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Original Research Article

Death Audit

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Abstract

Death reviews provide an important opportunity to examine the care afforded to a patient; to determine if it was appropriate or could have been delivered differently, help to identify improvements in end of life care and also to analyse medico-legal issues if any. The series of events that lead to a death can provide valuable inputs regarding the preventable aspects and various lacunae in medical care. Medical audit determines the quality of medical care provided to patients by analysing the clinical records and hospital services.

A retrospective analysis of death audits was conducted in a tertiary care teaching hospital. One or two cases were selected by an expert team every month. The cases were then presented by the respective departments. The audit was attended by all the faculty and residents in the other departments along with the medical director and other administrative heads. The death audits conducted over 5 years are analysed.

1. Introduction

Death is not a single event, but a series of events, relationships and preparation that takes place over time.[1] The series of events that lead to a death can provide valuable inputs regarding various aspects of medical care. Medical audit determines the quality of medical care provided to patients from analysing the clinical records and hospital services. Reviews of death provide an important opportunity to examine the care capsule of a patient; to determine if it was appropriate, and also to identify refinement in end of life care. It also helps to know 'how' and "why" something happened.

The hospital mortality rate (the proportion of patients who die during or shortly after admission to hospital) would be expected to reflect the safety, effectiveness and, in emergency medicine, timeliness of care and would intuitively seem to be an important measure of quality.[2]

Death audits also help to know whether there are documentation errors with regard to hospital records. It also helps to analyse inter-departmental coordination with respect to patient care.

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Medico-legally it helps to focus on the legal aspects of patient care e.g. consent, prognosis, likely complications etc.

2. Aims and Objectives:

- To analyze the deaths occurring in tertiary care referral teaching hospital.
- To analyze the preventable aspects of any death occurring in the hospital.
- To analyze medico-legal issues if any

3. Materials and Methods:

The study was conducted in a tertiary care hospital. The hospital has 950 beds and is attached to a medical college. To review and audit all deaths that occur in the hospital, a three-member death audit team was constituted. Deputy Medical Director of the hospital was the chairperson of the death audit committee, and provided important insights into the administrative aspects of the death. Professor in Forensic Medicine was the second member of the team, and provided inputs regarding the medico-legal aspects and implications of the death. Third member was an independent Senior Associate Professor who was the member secretary of the audit committee.

4. Conduct of the audit:

In event of every death that occurred in the hospital, a death summary is typed which includes all the relevant clinical information, investigations, course of events and cause of death. This death summary is signed by the head of the unit and the summary is submitted along with the case record file to the Medical Record Department [MRD]. The entire death summaries are then assessed by the member secretary of the audit. Few cases are shortlisted and presented before the audit death team. Case files are reviewed and one or two cases are selected to be presented before all the faculty of the hospital. The death summary of the selected case is emailed to the faculties and residents of the concerned department 3-4 days prior to death audit.

The respective unit is informed and asked to prepare a power point presentation. The presentation includes the case history on admission, provisional diagnosis, investigations, and clinical course. The presentation also includes the past history and relevant clinical and administrative challenges. There is also a discussion on the cause of death. It is expected that all doctors follow MCCD as per ICD-10. MCCD forms an important document with regards to cause of death, patient care, health programme implementation etc. The pitfalls are also discussed. The audit is attended by the administrative heads of the hospital, all faculties in the hospital and medical college and the residents.

Minutes of the audit are documented and filed. The audit was conducted once a month. Feedback from the faculty was also recorded. 5 years' compilation of the audits conducted was done and tabulated.

5. Results:

In total 53 death audits (comprising 72 cases) were conducted in 5 years. 7 monthly audits were combined with the subsequent month due to national holiday/s or any administrative challenges/problems.

Table no. 1: Department Wise Participation in the Death Audits

Department	Number of cases presented in Death Audits	Department	Number of cases presented in Death Audits
Medicine	24	Intensive care	4
Surgery	14	Cardiology	1
Pediatrics	14	Microbiology	1
Obstetrics & Gynecology	5	Radiology	1
Anesthesiology	2	Pulmonary Medicine	1
Orthopedics	2	Oro-Maxillo-Facial Surgery	1
Dermatology	2		

Maximum death audits were presented by the department of Medicine, as deaths occur maximum due to medical disorders (Refer to **table No. 1**). The maximum deaths occurred in the ICU as all the critically ill patients were admitted in the intensive care unit. Maximum inter-departmental participation was encouraged to aid horizontal integration in the methodology. The death audit as one of the innovative and best practice of the institution was appreciated by the visiting accreditation team.

6. Discussion:

Audits of death is an important aspect of health care and are utilized by the Government too to analyze the deaths e.g. maternal mortality audits, perinatal mortality audit, neonatal mortality audits etc. These audits provide inputs of the events and circumstances leading to the death. The preventable aspects of the mortality are assessed and corrective measures can then be directed towards the deficiencies.

Research has identified that a percentage of hospital deaths, upon review, can be categorized as preventable.[3,4] Review meetings also promote a culture of continuous improvement in the services delivered to patients at the end of life.[5] A discussion with regards to-

- What went well in the care of this patient and their family at the end of life?
- What didn't go well?
- Would the way this patient died be acceptable to me?
- What would I do differently in the future when caring for end of life patients and their families?
- Are there some things that may help in improving patient care in future cases?

The 5 year audits provided a platform to look at the mortality and provided a timeline to initiate rigorous process to notify, investigate and rectify system errors if any. This process also includes the implementation and evaluation of recommendations so that we are continuously learning from our shortcomings in order to provide the best possible care to our patients.

Reviews of death form one component of safety and quality improvement processes, complementing information identified from the reporting and investigation of clinical incidents, and the investigation of patient complaints.[3,4]

Documentation of medical records is vital in the era of consumer protection act and increased number of cases being filed against the doctor. Forensic expert in the death audit team helped in identifying areas where there were lacunae in medical records, consent and informed refusal. Clinicians in general are reluctant to be involved in medico-legal issues and are also unaware about the relevant acts applicable to medical practice. Death audits also helped to identify common areas of errors by clinicians in medical record keeping, communication with concerned authorities and issuing of various certificates. Medico-legal expert should always be a part of death audit team.

7. Limitation of the study: It does not provide any crude mortality rate or the risk-adjusted mortality rate which are more specific health care markers. There can be selection bias and case confirmatory bias during the case allocation for the audit.

8. Conclusion:

A death audit ensures that all the deaths are reviewed and categorized. The preventable deaths are to be investigated in detail and the shortcomings are to be rectified. It also gives inputs with regards to medico-legal issues that may arise from medical records, certification and communication with concerned authorities. Audits of the death is an innovative and best practice, needs to be imbibed in the hospital culture. Audits of deaths are a learning exercise for all tiers in the health care system.

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Review Article

Overview of Clinical Establishment Act

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Abstract

Central government formed The Clinical Establishments (Registration and Regulation) Act, 2010 ("Act") to offer for registration and directive of all clinical establishments in the country with an idea to prescribe the least standards of facilities and services provided by them. As per this Act "Clinical Establishment" is defined establishment comprises all hospitals, maternity home, nursing home, dispensary, clinic, etc. or an institution by whatsoever named that provide services for diagnosing and treatment for diseases and injuries. This act extends to all establishments owned by public (comprises of central government, state government, municipal corporation or trust) as well as private authority (individual or group of doctors). In 2010, the Parliament of India passed the Clinical Establishment Act (CEA) to regulate clinical establishments in both the public and private sector. So far 11 states have adopted the act, including Arunachal Pradesh, Himachal Pradesh, Mizoram, Sikkim, Uttar Pradesh, Uttarakhand, Rajasthan, Bihar, Jharkhand, Assam and Karnataka. Maharashtra has not. To conclude that Clinical establishment act if implemented effectively can serve as ideal healthcare situation in the country after rectifying the loopholes in current act.

1. Introduction

Central Government formed The Clinical Establishments (Registration and Regulation) Act, 2010 ("Act") to offer for registration and directive of all clinical establishments in the country with an idea to prescribe the least standards of facilities and services provided by them. This act consists of dissemination of legislation for health facilities & services, disease control & medical care, human power (Education, Licensing & Professional liability), Ethics and Patients privileges, Pharmaceuticals& Medical Devices, Radiation Protection, Poisons & Hazardous Substances, Occupational Health and Accident Prevention, Elderly, Disabled & Rehabilitation Family, Women and child Health, Mental Health, Smoking/Tobacco Control, Social Security & Health Insurance, Environmental Protection, Nutrition. Hence, the report tinted for the want for a central legislation for registration of clinical establishments in the country and homogeneous standards need to be established for the whole country. [1]

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2. Objectives of the Act

Clinical establishment act was enacted with following objectives.

i. For creating digital registry of Clinical Establishments at National, State and District level.
ii. Compulsory registration will help to keep check on quack doctors.
iii. By setting minimum standards of infrastructure, personnel and facilities for various healthcare establishment will augment the class of patient care.

3. Need for this legislation

As per Article 47 of Constitution, government should take necessary steps for augmenting public health.

- In the private sector, outpatient care is provided in 80% cases and inpatient care in 60 % cases. As per NSSO estimates, about 40% of the private care is most probably given by informal unqualified persons.
- On comparative basis, public sector being considered as value for money, as it takes cares of 20% of outpatient care and 40% of inpatient care with less than 30 % of total expenditure. It also provides 60% of end of-life care and almost 100% of preventive and promotive care and a significant part of medical and nursing education as well within the same expenditure.
- In India, 60 to 70 % of total expenditure on health is by out of pocket payments and mainly in the private sector.
- There is extraordinary progress of private sector, but it is principally unregulated. Thus, health regulation remains to be unsettled.
- Most of states have either no legislations or obsolete /ineffective legislation. Most of the states have not implemented that legislation.
- Therefore, there is a general observation that existing governing procedures are deficient or do not guarantee health care services of satisfactory class and that which prevent negligence.
- There is no proper information of health establishments and resources in different parts of the country, with the policy makers.[2]

4. An overview of the Clinical Establishments (Registration and Regulation) Act

One of the primary tasks of the state is to provide basic health care as well as prevention of intoxicants and drugs except for medicinal purposes which are harmful to health as per Article 47 of the Constitution of India. Therefore, Indian government brought this act with aim to fulfil this task.

As per this Act "Clinical Establishment" is defined establishment comprises all hospitals, maternity home, nursing home, dispensary, clinic, etc or an institution by whatsoever named that provide services for diagnosing and treatment for diseases and injuries. This act extends to all establishments owned by public (comprises of central government, state government, municipal corporation or trust) as well as private authority (individual or group of doctors).

This act emphasizes on following parameters like health establishment should have adequate space for patients and relatives, facility for effective waste management and other parameters for operation theatre and labour rooms. This act also make provision for patient or his relatives to file complaint against clinical establishment. Maintaining proper records is also mandatory provision under this act. [1]

Except the armed forces healthcare institutions, the registration of all clinical establishments is made obligatory consisting of diagnostic centres and single-doctor clinics of all pathies of treatment both in the public and private sector. The quality of treatment, distribution of the resource and policy formulation will be facilitated by the registering authority. Even the healthcare institutions be

penalised for disobedience of the rules of this act. Similarly, various expert committees were formed to prepare Model cure strategy for general diseases. This act also made compulsory for the healthcare institutions to provide primary treatment before referring to higher centres particularly in accident and delivery of pregnant women in emergency. [1]

The National Council for Clinical Establishment

There is also provision for organisation of The National Council for Clinical Establishment which will lay down minimum guidelines for confirming appropriate healthcare as well as its regular review.

Procedure for registration of the Clinical Establishment

- Section 11 of this Act makes it mandatory for all persons having clinical establishment to get it registered as per the regulations of the act.
- Persons or authorities having clinical establishments have to fill the prescribed application format consisting of details of the clinical establishment for the purpose of permanent registration.

Minimum Standards to be followed by Clinical Establishments

- As per Section 12 of the act, minimum requirement needed by the owner for the purpose of registration as well as continuity of the clinical establishment are as follows.
  1. Least standards of amenities and services
  2. Least number of staff needed (Medical and paramedical)
  3. Facility for record keeping.
  4. Any other condition prescribed.
- The minimum standard for clinical establishment varies depending on the level of modality of treatment provided.
- Documents needed for the registration of the registration of the act were prescribed in 2014 by National Council for Clinical Establishments under the aegis of Director General of Health Services, Government of India after discussion with various stakeholders.
  1. Application layout for Permanent Registration of Clinical Establishments
  2. least Standards
  3. Formats for compilation of information and Statistics
  4. Outline for exhibit of Rates
  5. Standard Treatment strategy of all the pathies. [1]

5. CRITICAL ANALYSIS

- Clinical establishment act when it was formed it was considered to the ideal one as it prescribes minimum standards of treatment to be followed by all the strata of healthcare institution from the single doctor to corporate hospitals.
- Objective behind the act was that the people should get good quality treatment with affordable prices as well as ensuring that the private doctor does not engage in unethical practices.
- But it was opposed by private sector doctors saying that government expects good quality treatment and standard facilities but fees should be less. This is practically impossible considering the cost of managing the hospital including construction of hospital, equipment's and managing manpower.
- Doctors also oppose that this act made it mandatory to all clinical establishments to make the patient stable before referring to higher centres. This is not possible in the clinical establishment where no specialized doctors are available and necessary equipment does not exist.
- They also claim that it is the failure of government to manage the public sector hospitals and they want to regulate private sector hospitals.
- But the health activists claim that the private sector doctors do not want to give away the monetary gains arising out of the unethical practice.

- So far, this act has not been implemented as such to the potential. Even if it is implemented in the few states, it is implemented in diluted form after succumbing to the pressure of private healthcare doctors' associations. For instance, in state of Haryana, it was applied only to clinical establishment having 50 beds and above which was due to state wide protest from all medical associations. West Bengal is only state who has penalised two private hospitals for unethical practices through West Bengal clinical establishments act 2017.But even in this state, it is applicable to the hospitals with above 100 beds. [3]
- Few Private practitioners also state that this is draconian act with aim to wipe out single doctor private or small nursing homes as minimum standards needed as per this act are beyond the capacity of individual doctors. This move is considered to favour corporate hospitals which are mainly owned by politicians or industrialists having nexus with politicians.
- Additional Point in favour of implementation of clinical establishment act is exceptionally high expenditure of treatment. 18 lakhs bill was charged for seven-year-old dengue case, who ultimately died. In other case, bill of 83 lakhs was made in case of spinal injury and his condition deteriorated later. [3]

6. Clinical establishment act in Maharashtra

In 2010, the Parliament of India passed the Clinical Establishment Act (CEA) to regulate clinical establishments in both the public and private sector. So far 11 states have adopted the act, including Arunachal Pradesh, Himachal Pradesh, Mizoram, Sikkim, Uttar Pradesh, Uttarakhand, Rajasthan, Bihar, Jharkhand, Assam and Karnataka. Maharashtra has not adopted this act. There was delay in implementation of Clinical establishment act since 2010, as there was continuous opposition by the medical fraternity in the state of Maharashtra.

THE MAHARASHTRA CLINICAL ESTABLISHMENTS (REGISTRATION AND REGULATION) BILL 2014 DRAFT was enacted to make provision for the registration and regulation of clinical establishments in the State of Maharashtra and for matters connected therewith.[4] Branch of Medicine can be considered as a social sector instead of commercial service sector. Good quality health care should be available to all the citizens of India irrespective of its paying capacity. The healthcare system should be like that it should be economical to the patients and profitable to the hospital owners or other stakeholders. [5]

The draft Bill will substitute Bombay Nursing Homes Registration Act, 1949 which is in force and also has permanent provision of registration of all clinical establishments including single doctor clinics, various diagnostic laboratories. However, it excludes health establishments of armed forces and physiotherapists and includes all public and private establishments. It also describes emergency treatment and prevent misperception in the duties of doctors and responsibilities of the state. There is also provision of single window system for smoothening the registration process. It also specifies for transparency in rates of various treatments.

The grievance readdress system has been reinforced. By this bill, government want to increase the understanding between doctors and patients. Council will be set up which will formulate standard treatment which will be reviewed at regular intervals. It also mandates for penalty for non-compliance with its provisions. The draft also prescribes the minimum standards of facilities and services, the minimum requirement of personnel, mandatory preservation of records and reporting.

In contrast to the Central government's Clinical Establishments (Registration and Regulation) Act, 2010, the draft Bill does not mention specifically the fees of various treatments but clinical establishments have to display the fees of various treatments at the reception. There was grave protest by various civil rights activists for implementing CEA in the state of Maharashtra. [6]

On the contrary, Bombay Nursing Homes Registration Act, 1949 does not includes the nursing homes run by the government or by other body approved by the government on their behalf. It also excludes hospitals for mental illness registered under Indian Lunacy act 1912.[7] Clinical establishment act also takes into account nursing home or hospitals runned by Government or by other body approved by the government on their behalf. This is step further in also improving the standard of patient care at Government hospitals.

7. Recommendations

- Exclusion of out-patient clinics from space and infrastructure criteria, and inclusion of representatives of small-medium-sized hospitals in infrastructure standards-setting processes to ensure development of fair criteria; and
- A dedicated implementing public agency for this Act, with adequate staffing to avoid over-burdening existing district-level public health bureaucracy.

To conclude that Clinical establishment act if implemented effectively can serve as ideal healthcare situation in the country after rectifying the loopholes in current act.

Conflict of Interest: None.

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Case Report

Analysis of a Stab Injury Through Cartilaginous Tissue

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Article Info

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Abstract

Stabbing is the most common method of homicide in developing countries. Penetrating Injuries on the chest may be homicidal, suicidal or accidental in nature. Here we are reporting a fatal case of stab on chest through rib cartilage. The present case projects the importance of critical analysis of the stab wound on the chest particularly through the rib cartilage and how it will help in determining the weapon of offence and cause of death.

1. Introduction

A stab is produced when the force is delivered along the long axis of a narrow or pointed weapon, such as knife, dagger, nail, needle, spear, arrow, screw driver, etc. in the depth of the body that is deeper than its length and width on skin. [1] Violence has been always an integral part of the human civilization since its inception. Factors behind stab injuries are easily available weapons, method of killing, motive behind killing, family relationship like marital disputes, cultural, psychological, social influences, religious attitude, criminal activities, drug culture, political factors, unemployment and low social economic status.[2] Penetrating injuries of the chest are often associated with a range of potentially life threatening injuries.[3] A case is reported here where a careful examination of the stab wound on the chest through rib cartilage helped us to determine the weapon of offence and also the cause of death.

2. Case Report:

A body of a 19 years old male, was brought for autopsy. On history he had some quarrel on some issue with the other person while playing on the ground when he was stabbed.

On autopsy:

The body was that of a 19 years old male thin built and average nourished. Rigor mortis was well marked all over the body, eyes were partially opened. Dried blood stains were present on anterior lower half and lateral side of chest on both sides, anterior upper half and lateral sides of abdomen, both upper limbs, medial sides of both thighs and dorsum of both feet.

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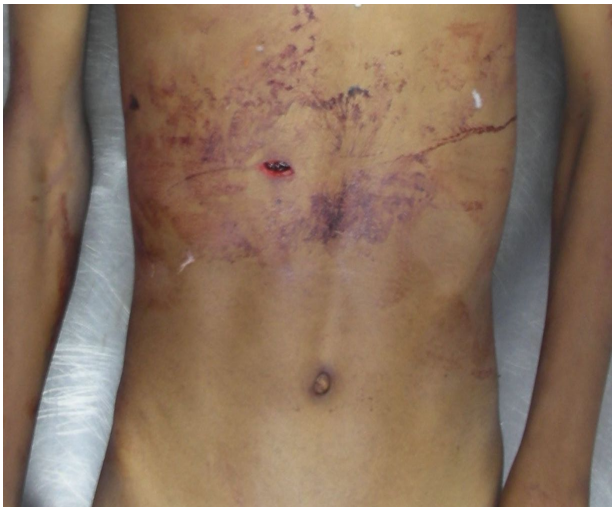
External Examination of surface injury:

Externally, there was a wound of size 2.7 X 0.9 cm, horizontal on right side lower costal region, 21 cm below sternal notch with medial angle 3.3cm lateral to the mid sternal line, both angles were acute, margins clean-cut and blood was oozing out of this wound (Refer to **Photograph no. 1a & 1b**). Lateral angle of this injury showed tailing of size 6.5 cm extending laterally and slightly downwards.

Photograph 1a: External appearance of wound with scale aside.



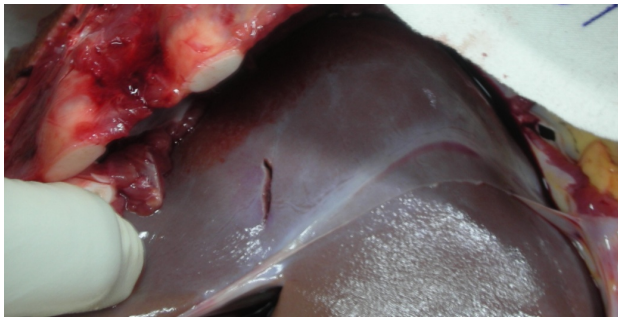
Photograph 1b: External appearance of wound with scale aside.

Internal findings:

After reflecting skin underlying muscles showed clean cut injury corresponding to the superficial injury. At the junction of 7th and 8th rib cartilage, there was a linear clean-cut injury, 2.3 cm in length, horizontal corresponding to the overlying injury (Refer to **Photograph no. 2**). On subsequent dissection liver capsule and liver showed a clean-cut injury of length 1.6 cm, parenchymal deep and slightly oblique, medial end lying at lower level (Refer to **Photograph no. 3**). Level of liver injury was 4 cm above the level of rib injury. On raising the right upper limb above the level of shoulder, both injuries were aligned maximally. On subsequent dissection, depth of liver injury is directed slightly upwards, backwards and medially towards medial portion of right lobe of liver, injuring porta hepatis and posterior capsule. Depth of parenchymal liver injury was 4 cm. All these findings suggested the surface injury was a stab wound with depth of 5.9 cm.

Photograph 2: Clean Cut injury to the rib cartilage

Photograph 3: Clean Cut Injury to liver



Peritoneal cavity contained about 2 liters of frank dark coloured blood. Cause of

death was hemorrhage and shock due to stab injury involving liver.

The weapon was seized and brought for examination. The weapon causing fatal stab was a foldable knife of length 32.3 cm. It had a metallic handle of 15.7 cm length and 3cm in breadth and a metallic blade of 16.6 cm in length. The blade had pointed sharp tip and two edges. The lower edge was sharp throughout from tip to handle. The upper edge was sharp up to 8 cm from the tip, after that it was blunt up to the handle. The breadth of blade at the level of 6 cm from the tip was 2.3 cm. This corresponded with the breadth of the injury to rib cartilage. Thus when the weapon was entrusted in the body up to the length 6 cm, the dimension of breadth of weapon exactly coincided with the dimension of costal injury (2.3 cm) and at this point the tip of weapon was penetrating the porta hepatis and posterior capsule of liver. This was concluded only after doing layer by layer dissection and we opined that this weapon caused the fatal injury.

3. Discussion & Conclusion:

Stabbing is one of the most frequent ways of committing homicide, which may result from any sort of enmity, family dispute, quarrel with friends or even for snatching valuables.[1] Generally speaking, stab wounds are most commonly homicidal. In homicidal cases, the covering clothes usually bear corresponding cut marks.[2] Stab-wounds of the thorax and abdomen were single in 71% of cases and multiple in 29% as reported by Garland JB. Fifty per cent of abdominal wounds were in the right hypochondrium, presumably due to the termination of an upward stab to the abdomen by a right-handed assailant. This corresponded well with the high number of liver, diaphragm and stomach injuries.[4]

The chest walls, where skin tends to be intermittently supported by underlying ribs, is relatively easy to puncture with a sharp knife. The depth of wound as measured at autopsy may be greater than the true length of the blade. This is common in abdomen and to a lesser extent in the chest, because the impact of a forceful stab may momentarily indent abdominal or chest wall so that the tip of knife penetrates tissues that apparently should have been out of reach. The differences in the position of internal organ as measured at autopsy in supine body, compared with their position in living body in upright position always exist. Such variations in the distance from the skin wound to the organ penetrated must be taken into account when assessing the depth of a wound.

Attempts to delineate the track of a stab wound before dissection by various methods like filling the defect with a radio-opaque fluid before taking X-rays or by filling with a plastic or even metallic substance that will harden to form a cast appear to have little advantage over careful dissection. MRI has been used to visualize the wound track in some cases.[5]

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Case Report

Death due to Stevens-Johnson Syndrome: A Rare Life Threatening Condition

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Key words
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Abstract

Stevens-Johnson syndrome (SJS) is a rare, immune-mediated, skin reaction that results in blistering of skin and extensive epidermal detachment. It is associated with HLA-B12 phenotype. SJS is generally triggered by medications (e.g. certain antibiotics and antiepileptic). The diagnosis primarily clinical which also resembles the clinical course of extensive second degree burns, but skin biopsies can be used to support the diagnosis and rule out other causes of vesiculo-bullous lesions. The risk for death can be estimated using the SCORTEN scale (Score of Toxic Epidermal Necrosis). Overall, the risk of death was 58 % based on SCORTEN score i.e 4 in this case of SJS. Pancytopenia can be a precocious indicator. Emphasis is given on histopathological examination which confirms the diagnosis. Septicaemia is one of the common complications in cases of SJS which is also the primary cause of death in the present case.

1. Introduction

Stevens-Johnson syndrome represents a continuum of disease, the most benign type of which is erythema multiforme, whereas toxic epidermal necrolysis is the most severe. The condition was first described in 1922 by Stevens and Johnson as a febrile illness with stomatitis, purulent conjunctivitis and skin lesions. The syndrome is rare immune-complex-mediated hypersensitivity. The incidence is 0.9-1.4 persons per million per year in general population. Patients with AIDS have a 1000- fold higher risk. 95 % cases are drug induced.[1] Over 220 drugs have been implicated. Most common drugs administered for a short term that are related to SJS are sulphonamides, penicillin, quinolones, cephalosporins and acetaminophen.[1] The reaction is independent of dose of drug and idiosyncratic.

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Food additives, fumigants, contact with chemicals, acute graft-versus- host reaction, immunization and viral infections are other rare causes It is associated with HLA-B12 phenotype. It is T-cell mediated disorder with CD8+ T-cells being predominant in blister fluid and epidermis and CD4+ T-cells in dermis.[2]

Keratinocyte cell death occur as a result of apoptosis mediated through activation of cascade of intracellular enzyme (caspases) which is induced by T-cells through Fas-Fas ligand(FasL) pathway. Fever, arthralgia, malaise, headache, vomiting, diarrhoea and myalgia followed by widespread blisters on the trunk and face with epidermal detachment. Acute skin failure- it result from extensive skin loss. Barrier dysfunction leads to loss of water and electrolyte, thymic dysregulation, immune impairment and infection. Systemic infections are the most common cause of death.[2] GI bleeding, pulmonary embolism, MI and perforation of gut are other causes. Old age, extensive epidermal detachment, visceral involvement, delay of >3-4 days in admission, early thrombocytopenia are poor prognostic indicators[3]. SCORTEN-It is a specific severity of illness score used to determine the prognosis. It should be determined within first 24 hours after hospitalization and again on day three.[4]

2. Case history:

A 65 years old male, suffering from fever with chills, decreased appetite and altered sensorium since 3-4 days, was prescribed tablet cefixime and tablet paracetamol at a private hospital. One day after ingestion, he developed lesions in oral cavity and all over the body. He was admitted at Nair hospital, Mumbai and diagnosed as case of acute febrile illness with acute hepatitis and acute kidney injury. He died after 3 days of admission. The deceased was a known case of NSTEMI with anaemia. On admission pulse was 107/min. laryngeal edema was present so patient intubated with endotracheal tube and kept on ventilator. Supportive treatment with skin care and I.V. fluids were given. Laboratory investigations show **blood Urea nitrogen** -52 mg/ dL, Platelet count -26000/ µl, Prothrombin -17.8 secs, Sr.creatinine -2.41mg/dL, Possassium level-5.8 mEq/L, Serum alkaline phosphate- 382 IU/L, serum uric acid-8.5 mg/dL, SGOP- 4333 Unit/ L, SGPT-3237 Unit/L, **bicarbonate** -15.20 mmol/L, Hb-6.5 g/dL, 2D echo- LVEF 60%, fasting blood sugar-96 mg/dL

3. Autopsy findings

External examination:

Multiple erythematous lesions to dusky macules on the chest, abdomen, both upper limb and lower limbs present (Refer to **Figure 1 & 2**). Multiple mucosal erosions and ulceration in nasal and oral cavity, pus discharge from eyes were present. There was about 30-35 % cutaneous surface epidermal detachment (estimated by the rule of nine).

Figure 1: Showing involvement of skin in patchy areas over anterior trunk and upper limbs

Internal examination:

In lungs pleura was hazy, rubbery in consistency, on c/s oedema and haemorrhage present. In heart, thin line of fibrotic patch in posterior septal region and area of necrosis of

papillary muscle present. LAD:10-20 % concentric block.

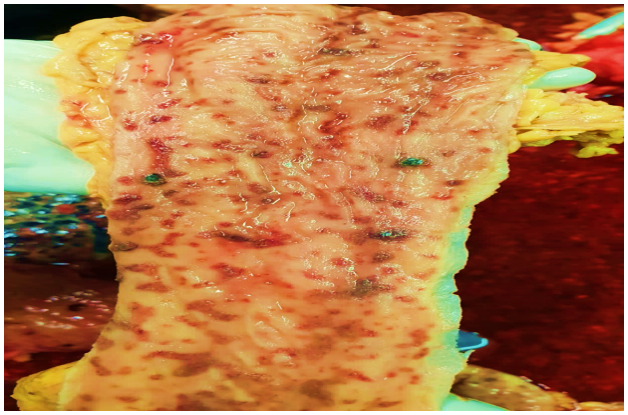
Figure 2: Showing exfoliated skin lesions and peeling of skin over back

Figure 3: Oesophageal mucosa showing multiple erosions with exudative membrane

Figure 4: Showing ulcers with greyish necrotic base at pyloric end of stomach

Oesophagus shows multiple erosions with exudative membrane (Refer to **Figure 3**). Multiple ulcers were present at greater curvature of stomach at pyloric end, 1-2 mm in diameter with greyish necrotic base and hyperaemic margins (Refer to **Figure 4**). Multiple ulcers present along the lumen of upper small intestine region, 1-2 mm in diameter with greyish necrotic base and hyperaemic margins (Refer to **Figure 5**). Provisional cause of death was given as "septicemia in a case of Stevens Johnson syndrome. However, organs preserved for histopathological examination."

Figure 5: Showing ulcers with reddish margins upper part of small intestine



Histopathological examination:

In lungs, pleura was fibrotically thickened with mild mononuclear cell infiltrate. Interstitium showed congestion and dilated blood vessels. Myocardium showed mild hypertrophy. Interstitium was oedematous with mild lymphohistocytic infiltrate areas of haemorrhages and congested blood vessels. Oesophageal mucosa was ulcerated with plenty of bacterial colonies (Refer to **Figure 6**). Focally yeast & filament of candida were seen. Serosa showed mild mixed inflammatory cell infiltrate. Stomach section showed ulcerated mucosa with plenty of mixed inflammatory cell infiltrate, predominantly lymphoplasmocytic infiltrate (Refer to **Figure 7**). Ulcerated areas showed filaments of fungi. Small intestine mucosa showed ulceration with dense lymphoplasmacytic infiltrate (Refer to **Figure 8**). Skin was necrosed & sloughed off epidermis was

seen on histopathological examination (Refer to **Figure 9**).

Figure 6: Oesophageal mucosa showing filament of candida & Serosa showing inflammatory cells

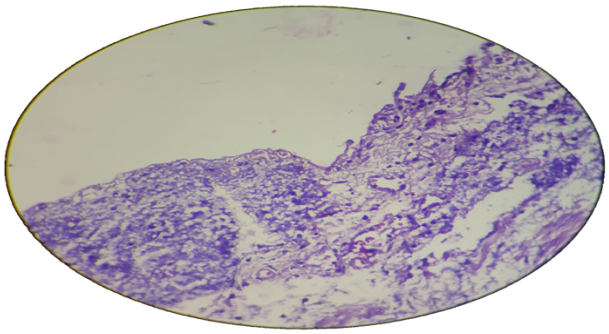


Figure 7: Stomach showing filament of fungi and bacterial colonies

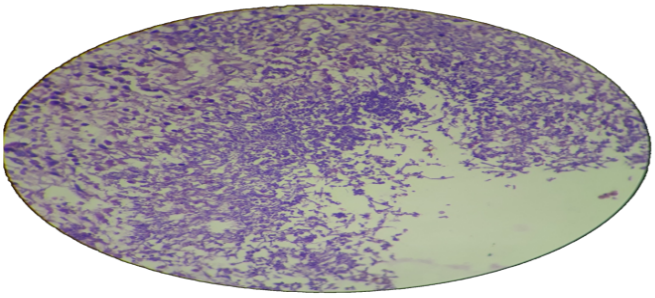


Figure 8: Small intestine mucosa showing dense lymphoplasmacytic infiltrate

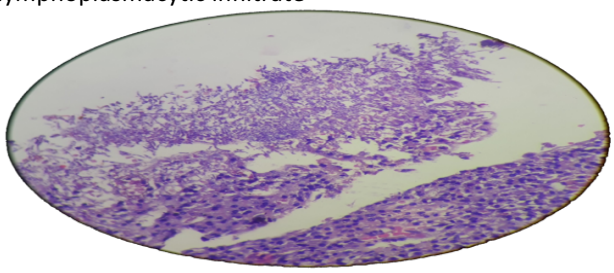
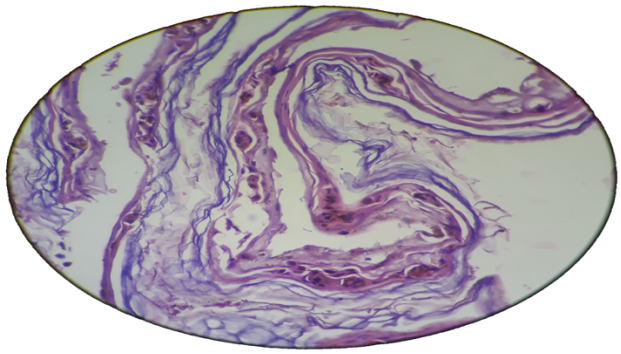


Figure 9: Skin showing necrosed regions in epidermis and dermis



Final cause of death was given as "Septicemia following multiple gastrointestinal candidial ulcers in a case of Stevens-Johnson syndrome"

4. Discussion

As per SCORTEN score in the present case age was more than 40 years i.e 65 years. Blood bicarbonate level was less than 20 mmol/l i.e 15.20 mmol/l. Blood urea nitrogen was more than 28 mg/dL i.e 52 mg/ dL. 30-35 % cutaneous surface epidermal detachment was noted. So the total SCORTEN score was 4 and Probability of death in this case of SJS was 58 %. Cause of death was the most common complication of SJS i.e Systemic infection. MI was present before consumption of any drug related to SJS. Also heart rate was less than 120/ min, so it was not included in total SCORTEN score.

5. Conclusion

Clinical course of SJS is like that of extensive second – degree burns. Early detection of thrombocytopenia may lead to better prognosis. Use the common drug regimen with caution with detailed history of past drug consumptions. All drugs that are not lifesaving should be stopped immediately as SJS is an emergency situation. First-degree relatives should be instructed to avoid any identified drugs or chemicals as it has specific phenotype association.

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Case Report

Significance of Forensic Expert in Medico Legal Autopsy

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Abstract

In India, majority of medico legal work is done by Medical Officers working at primary health centres and rural hospitals. The doctors conducting these medico legal duties are MBBS graduates or non-forensic post graduates. Due to lack of sufficient knowledge in Forensic Medicine, local political pressure, dominance of investigating officers and misleading inquest reports in addition to inadequate, untrained support staff, such medical officers are known to commit mistakes. This in turn causes injustice to the victim which eventually hampers the very essence of Forensic Medicine. Very few cases are conducted at tertiary level hospitals where trained Forensic Experts are available. Here we present a case which was referred to our tertiary care centre for autopsy. The autopsy was conducted by a team of Medico legal experts and the cause of death revealed homicide with sexual assault and resulted in ultimate justice to the victim.

1. Introduction

In India, majority of medico legal work is done by Medical Officers working at primary health centers and rural hospitals. The doctors conducting these medico legal duties are MBBS graduates or non-forensic post graduates. Due to lack of sufficient knowledge in Forensic Medicine, local political pressure, dominance of investigating officers and misleading inquest reports in addition to inadequate, untrained support staff, such medical officers are known to commit mistakes. This in turn causes injustice to the victim which eventually hampers the very essence of Forensic Medicine. Very few cases are conducted at tertiary level hospitals where trained Forensic Experts are available. Here we present a case which was referred to our tertiary care center for autopsy. The autopsy was conducted by a team of Medico legal experts and the cause of death revealed homicide with sexual assault and

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resulted in ultimate justice to the victim.

2. Background

A body of an unknown female was brought to our Institute as on 18.4.2018 where she was declared as brought dead and a medico legal autopsy was advised. No other significant history was available. The Police Inquest merely mentioned the clothes worn by the deceased and surprisingly, the absence of any injuries over the body. As per the inquest, she was about 35 years of age.

3. Autopsy Findings

External Examination

At autopsy, on external examination the deceased was found wearing a light purple saree with pink silver border, light purple colored blouse with a tear of size 4 cm on the right sleeve,5 red and 2 golden red bangles over the right wrist and 2 golden red bangles on the left wrist. Reddish stains were present over the saree at places.

Multiple old linear horizontal scars were present over the anterior aspect of left wrist, anterior aspect of left forearm and the left shin. The scars were of variable dimensions but horizontal in nature.

The face was congested with petechial hemorrhages (tardieu spots) over the face and neck with cyanosis of the lips, earlobes and nose. The tongue was clenched between the teeth. Redness was present over the left lateral wall of the vaginal orifice. Blood stains were present over the perineal and inner aspects of thighs.

Following ante mortem injuries were noted on the person of the deceased:

1. A ligature mark in the form of pressure abrasion, transversely encircling the neck, over the thyroid cartilage, continuous and more prominent over anterior and right antero-lateral aspect of neck; intermittently present over left side of neck with peri-ligature abrasions and ecchymosis.(Refer to Figure No.1) The ligature mark was 41 cm in length, 2 cm in maximum breadth, dry and reddish brown in color. On dissection, a contusion underneath the ligature mark was noted on the left side of neck and diffuse hemorrhage on rest of underlying part of neck over underlying subcutaneous tissues, left sternocleidomastoid muscle, strap muscles, muscles of posterior cricoid region and laryngeal mucosa (Refer to Figure no.2). Epiglottis, glottis and pyriform fossa were deeply congested (Refer to Figure no.3). There was no evidence of fracture of hyoid bone or cartilage.

Figure 1: Ligature mark over neck

Figure 2: Hemorrhage within strap muscles of neck

2. Two linear pressure abrasions over both the angles of mouth extending downwards and obliquely over sides of cheeks, of size 9 x 0.8 cm on right side and 5 x 0.5 cm on left side, reddish (Refer to Figure no.4).
3. Contused abrasion involving left orbital region of size 5 x 4 cm with dried blood adherent, dark red (Refer to Figure no.4).

Figure 3: .Severe congestion of pyriform fossa and epiglottic & aryepiglottic folds

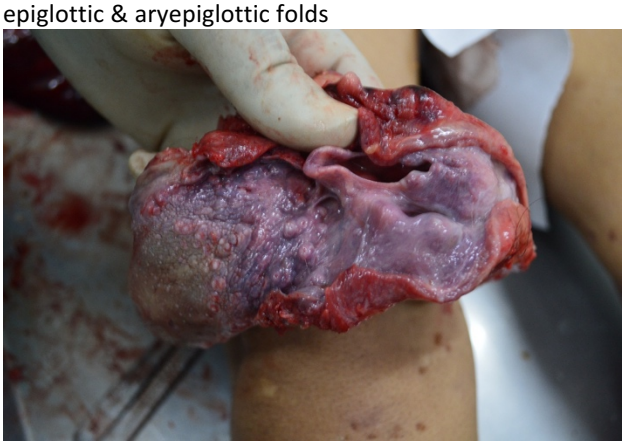

Figure 4: injuries over angle of mouth and left orbital region

4. Two lacerations over left upper eyelid of size 1.5 x 0.4 cm, muscle deep and over left lower eyelid of size 1 x 0.4 cm, muscle deep, horizontally placed reddish(Refer to **Figure no.4**).
5. Multiple abrasions present over left maxillary region of size varying from 1 x 0.5 cm to 0.5 x 0.5 cm, irregular, reddish (Refer to **Figure no.4**).
6. Abrasion present over root of nose, 2 x 1.5 cm, irregular, reddish.
7. Contused abrasion over left ala of nose, 1.5 x 1cm, irregular, reddish.
8. Contusion over left arm, antero medial aspect, 3 x 2 cm, irregular, bluish.
9. Multiple abrasions over right hypochondriac region, sizes ranging from 1 x 1 cm to 0.5 x0.5 cm, irregular, reddish.

Discrepancies regarding injuries not mentioned in the inquest were informed to the investigating officer as well as to their higher authorities.

Internal Examination

On internal examination, following injuries were noted :

1. Underscalp contusion of size 3 x 2 cm over left parieto temporal region, reddish.
2. Underscalp contusion of size 4 x 3 cm over left parieto occipital region, reddish.

Another vital autopsy finding was presence of traces of whitish sticky discharge were present at the vaginal introitus (Refer to **Figure no.5**), vaginal canal, and at cervical os (Refer to **Figure no. 6**).

Figure 5: Sitcky whitish discharge with redness at the vaginal introitus

Figure 6: Sticky discharge at the cervical os

Samples preserved

During autopsy, following samples were preserved in proper preservatives, sealed and handed over to the Investigating officer with instructions to forward it to the Regional Forensic Science Laboratory immediately and submit the results as soon as possible.

- Routine viscera for chemical analysis.
- Nail clippings of both hands for detection of foreign body/epithelial cells.
- Matted pubic hairs for detection of semen / spermatozoa.
- Swabs from vaginal, high vaginal, peri vaginal, peri anal, cervical and oral cavity for detection of semen/spermatozoa.
- Smears from vaginal, high vaginal, peri vaginal, peri anal, cervical and oral cavity for detection of semen/spermatozoa.
- Blood sauced gauze piece for grouping.

Provisional cause of death was given as "Ligature Strangulation" and the Investigating officer was instructed to investigate according to this. The Chemical analysis reports were received in due course of time which indicated that

- Routine viscera examination did not reveal presence of any poison or intoxicant.
- Nail clippings showed dust particles which matched with the site at which body was found.
- Vaginal swabs showed presence of semen.
- Vaginal smears showed presence of spermatozoa.

4. Outcome of Case

On reviewing the autopsy report and chemical analysis reports, the final cause of death was given as "**Ligature Strangulation with Sexual Assault**" (Unnatural). On further investigation by the Investigating Officer, an accused was arrested who confessed to kidnapping, sexually assaulting and then strangulating the said woman.

5. Discussion

The medicolegal work is of a specialized nature. It is entrusted to Medical officers who are expected to have knowledge about it and who have been trained through various workshops organized by the training centres. The quality of medico-legal work has its repercussions on law proceedings.[1] The Medical officer should read the Police inquest and requisition thoroughly to arrive at the cause of death or the probable cause of death on completion of autopsy. For this he must take into consideration all the findings. The cause of death is to be based only on the basis of findings and not on extraneous factors. A complete or full autopsy should be performed to ascertain the definitive cause of death.[2]

As per the Indian Legal System, at present a Registered Medical Practitioner is legally competent to handle any medico legal case. The basic undergraduate degree is labeled as MBBS. In India almost 80-85% of the total medico legal workload is handled by these medical graduates. The condition in bigger cities is different where government and private medical colleges are situated. In most of these cities, the medicolegal work is handled by forensic medicine experts. [3]

In cases where death may be due to unnatural causes, the competent authority, accompanied by one or more medico-legal experts, must investigate the incident or death scene, examine the body and decide whether an autopsy should be carried out. [3]Medicolegal experts must exercise their functions with independence and impartiality. They may not be subject to any form of pressure and they must exercise their functions in an objective manner, in particular in the presentation of their results and conclusions.[4]

For the forensic expert the information provided by the investigating authority and police is crucial for choosing the appropriate technique and making the correct

interpretation. All relevant information surrounding the death including the medical history of the deceased has to be provided before, during and after the autopsy.[4]Where appropriate, before beginning the autopsy, body orifices are to be swabbed for the recovery and identification of biological trace evidence.[4]

The significance of the powers of observation and interpretation of autopsy findings, awareness of different possibilities, and a flexible and open mind, of the autopsy surgeon, is always stressed.[5] The failure to maintain a high standard of care of postmortem examination due to a low level of competency in forensic pathology can lead to mistakes in opinions concluded by the autopsy surgeon causing errors and ultimately injustice. [5] The literature reports forensic autopsy cases with erroneous opinions related to the cause of death, that further emphasizes the requirement of adequate training of the autopsy surgeon. [6]

6. Recommendations

1. Due emphasis should be given to quality teaching of Forensic Medicine in undergraduate course specially in medico legal autopsies.
2. Students should compulsorily attend medico legal autopsies as prescribed by the University.
3. Regular training of Medical Officers should be conducted to update their Medico legal knowledge.
4. Cases should be diligently referred to Higher centres where due suspicion is present.
5. Major discrepancies in Inquests should be immediately brought to the notice of Investigating Officers as well as their seniors and necessary corrections should be done before commencing autopsy.
6. A Forensic Expert should be appointed at District level to look after the Medico legal work.
7. A Helpline number should be started where Medical Officers can consult with Forensic Experts at Medical Colleges.

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Case Report

Spontaneous Rupture of the Inferior Vena Cava in Liver Cirrhosis

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Article Info

Key words
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Abstract

Rupture of inferior vena cava is a rare cause of retroperitoneal hemorrhage, and is associated with blunt or penetrating trauma. Spontaneous rupture of inferior vena cava occurring without a trauma history, however, is an extremely rare clinical entity with only a few case reports in the literature. A 38-year-old male brought dead to our apex medical college with abdominal pain and vomiting. Had past medical history showed a chronic abuse of alcohol leading to liver cirrhosis. On internal examination tear in the inferior vena cava anterolaterally with mixed micronodular and macronodular cirrhosis pattern.

1. Introduction

Among the complications of chronic liver disease due to portal hypertension are variceal bleeding, ascites, and hepatic encephalopathy. Variceal bleeding occurs mainly from the esophageal and gastric veins, but in rare cases bleeding into the intraperitoneal region may occur.[1] While retroperitoneal hemorrhages are generally caused by traumas, they can also develop as a complication of vascular lesions, tumors, surgical interventions, or anticoagulant therapy. Rupture of inferior vena cava is a rare cause of retroperitoneal hemorrhage, and is associated with blunt or penetrating trauma. Spontaneous rupture of inferior vena cava occurring without a trauma history, however, is an extremely rare clinical entity with only a few case reports in the literature.[2] Here in we are reporting a case report of patient died with spontaneous rupture of inferior vena cava may be the cause of massive infra abdominal bleeding in a case liver cirrhosis not associated with trauma or rupture of aorta.

2. Case History

A 38-year old male brought dead to apex medical college with abdominal pain for 3 days, associated with vomiting. Patient also reported abdominal distension for last 2 months. His past medical history showed a chronic abuse of alcohol leading to liver cirrhosis. No hematemesis or melena. In an early morning of the day of incident, there was a bout of single vomiting followed by collapse.

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3. Autopsy Finding

On the same day of the incident the deceased was brought for medicolegal autopsy at our hospital. On external examination-The deceased was average built with well developed rigor mortis in the whole body. Faint postmortem lividity was seen over back and was fixed. Yellowish discoloration of sclera with severe pallor. No evidence of any external or internal injuries. On internal examination - No bony injuries were seen. Brain was intact with pale. Both lungs were pale and intact. Large right-sided retro-peritoneal hematoma (Refer to **Fig.1**) and free blood which was about 2.5 liter found in the peritoneal cavity. Liver yellowish – brownish, 1.2kg weight, mixed micronodular and macronodular cirrhosis pattern, scattered larger nodules on the surface of the liver, firm in consistency (Refer to **Fig.2**).

Fig 1: Retroperitoneal Hematoma

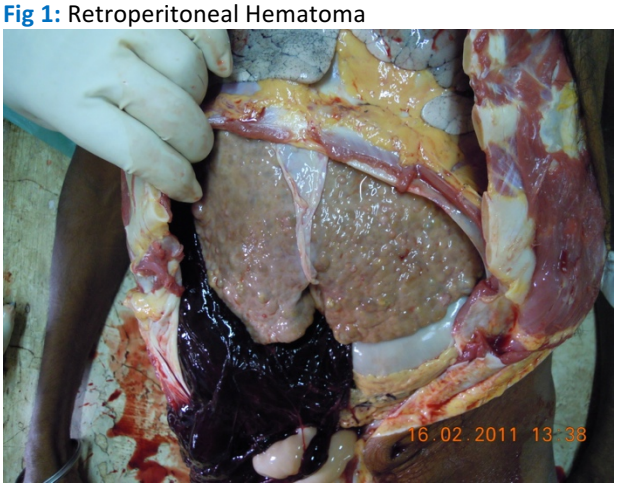
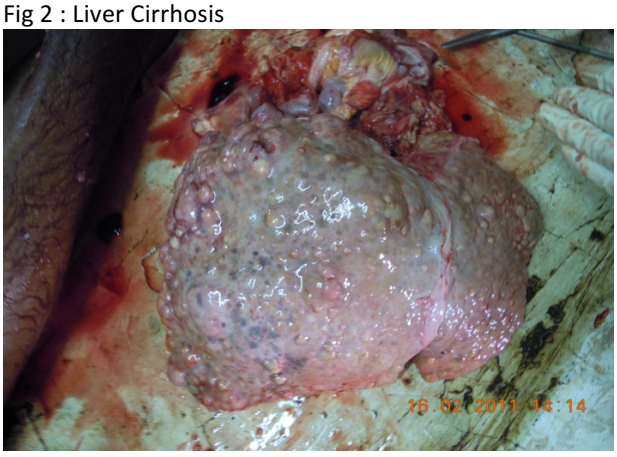


Fig 2 : Liver Cirrhosis



The abdominal aorta was of normal caliber throughout its length with no evidence of an aneurysm or rupture. There was a 0.70 cm tear in the inferior vena cava anterolaterally on the right side at Thoracic -8 vertebra level (Refer to **Fig.3**). Spleen and kidney intact. Portal vein and anastomosis was normal with no evidence of varices. Stomach contain 30ml of brownish fluid with no abnormal smell, mucosa normal. “Shock and hemorrhage following tear of inferior vena cava in case of cirrhosis of liver” labeled as cause of death.

Fig 3: Tear In Inferior Vena Cava

Discussion:

As early as the 17th century, it was realized that structural changes in the portal circulation could cause gastrointestinal bleeding. In 1902, Gilbert and Carnot introduced the term "portal hypertension" to describe this condition. Cirrhosis is the most common cause of portal hypertension and alcohol-induced liver disease and cholestatic liver diseases are other common causes of cirrhosis.[3]

In present case middle aged adult suffering from mixed micronodular-macronodular cirrhosis which was advanced form cirrhosis. Deceased was chronic abuse of alcohol. Chronic alcohol consumption causes variety of adverse effect of which 8-20% of chronic alcoholic developed cirrhosis.[4]

Bleeding due to portosystemic shunts mainly results from esophageal and gastric varices. In rare cases, intraperitoneal and retroperitoneal hemorrhage due to portal hypertension have been reported. While esophageal variceal bleeding mainly presents with hematemesis and melena.[1]

In the present case there was no history of hematemesis and melena also there was not any evidence of variceal bleeding from portocaval anastomosis. So, possibility of intraperitoneal and retroperitoneal hemorrhage due to portal hypertension had been ruled out.

Ruptures of inferior vena cava are frequently associated with blunt or penetrating trauma. Spontaneous rupture of inferior vena cava which develops without any prior trauma history is a very rare clinical entity with very few reported cases in the literature.[2] Injury to the inferior vena cava carries a very high mortality, varying from 57% to 95%. The usual cause of death in such cases is oligemic shock or ensuing renal failure. Injury to the inferior vena cava results from trauma or during operative procedures in the vicinity. Nearly 33% of patients with traumatic rupture or tear of the vena cava die before reaching hospital. In the remaining 67%, the mortality is reported to be as high as 50%, despite active resuscitation and an early operation.[5]

Rupture of inferior vena cava in previously published three cases was located 1-2 cm superior to the iliac vein bifurcation and had a diameter of 0.75-1 cm while showing a linear character. While in our present case tear was at the level of Thoracic- 8 vertebra, of 0.70 cm in diameter. The rupture was on the anterolateral region of inferior vena cava, which was on anterior surface and over the posterolateral region of inferior vena cava in previously published 2 cases and 1 case respectively.

Tugrul Goncu et al[2] suggest venous hypertension and stasis due to right sided heart dysfunction may be predisposing factor for spontaneous vena cava rupture. Nair et al[5] determined no predisposing factors in their case. Mulkern et al[6] noted a history of right nephrectomy due to tuberculosis. In our present case there was history of chronic alcohol abused with advance form of liver cirrhosis present. But in all the four cases there was not any specific pathological relation between inferior vena cava rupture with right nephrectomy due to tuberculosis, venous hypertension and stasis due to right sided heart dysfunction and liver cirrhosis.

Histopathological examination of inferior vena cava portion in all four cases including our case were not demonstrated any abnormality. However, all three previous cases diagnosed as multiple organ failure, secondary to hypovolemic shock associated with hemorrhage. In the present case hypovolemic shock associated with hemorrhage following rupture of inferior vena cava.

Although the data gathered from all patients are not adequate, we believe that spontaneous rupture of inferior vena cava may be associated with the combined effects of reduced vascular compliance and weakened vessel wall along with elevated intraluminal pressure.[2]

Conclusion:

Spontaneous rupture of the inferior vena cava is an exceptionally rare cause of intra-abdominal haemorrhage. Although vascular thinning that results from hemodynamic changes caused by portal hypertension might be the reason. But spontaneous rupture of inferior vena cava may be associated with the effect of multiple combined factors.

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Letter to Editor

Competency based Medical Education: A Brief Overview

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To,
The Editor-in-chief, JFMSL.

Competency based medical education (CBME) is aiming to impart medical education to train graduates by developing the essential competencies to cater the healthcare services as per the need of the society.[1] There is widespread adoption of a competency-based approach with a paradigm shift in the traditional approach of undergraduate medical teaching-learning pattern. The current traditional medical education is time-based and subject centric. The teaching-learning pattern is more knowledge oriented and less attention given to impart graduate's learning on attitude & skills development. The assessment is of summative type with little opportunities to provide appropriate feedback by learner. This leads to gain of extraordinary knowledge by graduates but lack of basic clinical skills which are needed in practice. The attitude & skill development is deficient. Also, soft skills development is poor. The graduates may lack in appropriate soft skills in medical ethics, professionalism, communication skills and doctor-patient relationship.[2]

These concerns may be solved by introducing the competency based medical education replacing the current traditional time-based, subject-centric training of undergraduates in medical education. The Medical Council of India (MCI) has been suggested for implementing competency-based medical education curriculum in all the medical colleges which focuses on the desired and observable ability in medical graduates to ensure competent healthcare services towards needy.[2] Competency means doing something efficiently, effectively and successfully. Competency is health professional's ability to encompass various components such as knowledge, skills, attitudes, and ethical values with ability of application of those acquired competencies in real settings of professional practices while providing the health care services to needy.[3]

CBME is an outcome driven medical curriculum making medical education more environment appropriate, learner-centric, patient-centric, gender-sensitive and outcome-oriented. It helps to create competent, trained healthcare professionals to address the healthcare need of society. It promises greater accountability, flexibility in undergraduate medical education. The learning is more student-centric with appropriate opportunities to provide feedback leading to the improvement in skills and knowledge of learner. The training would be not time-based but may be continued till desired level of competencies is achieved by learner.[3]

In CBME, the assessment would be formative in

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nature with increased frequency with appropriate opportunities for feedback focusing the teaching-learning in real-life medical practice. In consideration with the learner-centered approach with flexibility in time, CBME focuses on outcomes.[3] It prepares the graduates for actual professional healthcare services in society. Hence, the teaching–learning activities would be more skill-based with involving more clinical, hands-on experience to students and opportunities to improve next performance. The key features of effective assessment in CBME are it needs to be frequent & continuous, it should be criterion-based, largely work-based, ensures active involvement of trainee & qualitative approach. The tools of assessment should be valid, reliable, widely acceptable, having educational impact, and cost-effective. Hence, workplace-based assessment would be the backbone of CBME.[4]

CBME implementation needs a lot of additional resources such as infrastructure, manpower, material. Also, teachers need to alter their own attitude and approach to meet the need of new curriculum model. The challenges in CBME implementation may cause reluctance to change and apprehension among learners, teachers, and educational administrators.[5] A chaotic situation may be created due to de-emphasis on time-based training of traditional current medical curriculum model as with CBME model learner may progress at their own pace. Usually students are teacher-driven and used to time-based learning. Hence, they may find it difficult to adjust with new model curriculum.[6]

The current medical education system is a "Tea bag model of medical education," that is the time-based, teacher-centric, knowledge oriented educational system ignoring competency on personal skills and attitude achievement. In an era of technological advancement with greater public accountability, the curricular reform is needed ensuring that all graduates are competent in all essential domains to cater the professional quality health care services at par with the changing needs of society.[6]

For implementing this novel concept of CBME in India, stakeholder's sensitization and training would be need of hour. This may facilitate its acceptance and uniform implementation all over nation. The herculean task of this implementation needs visionary leadership, continuous positive efforts with shared accountability and responsibility by all stakeholders.[7]

Many medical schools around the globe have adopted "Competency based Medical Education framework- a outcome-based model" for medical education to ensure that all medical graduates are enough competent to serve the society at par with their healthcare needs. CBME model would be more efficient than the traditional knowledge oriented, time-based, teacher-centered, informative model of education, as it focuses on learners' competencies for doing professional tasks in alignment with the healthcare needs of the society.

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