

Original Research Article

Medico-legal aspect of maternal death

Ravindra N. Kuralkar^{1*}, Nilesh A. Devraj², Dhiraj B. Buchade³

¹Ordnance Factory Hospital Chanda, Maharashtra, India

²Department of Forensic Medicine and Toxicology, Shri B. H. Medical College, Dhule Maharashtra, India

³Department of Forensic Medicine and Toxicology, Maulana Azad Medical College, New Delhi, India

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*Correspondence:

Dr. Ravindra N Kuralkar,

E-mail: ravindrakuralkar47@gmail.com

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ABSTRACT

Background: With the increasing numbers legal suits against the practicing doctors now a day, it's important to address sudden and unexpected death of young female during pregnancy or birth which leads to severe strain and anguish to family members. If this is not adequately resolved, healing cannot occur. It is then that the family may pursue the legal process to help obtain answers about what happened and, more importantly, why it happened to their loved one.

Methods: Total 95 cases of maternal deaths which were brought for postmortem were studied during period of August 2012 to July 2014.

Results: Maximum cases of deaths occurs after normal delivery 44 (46.3%) and deaths in hospital were 72 (75.8%). In 7 (7.4%) cases death was occurred during transport to medical facility. Post-partum hemorrhage remains the leading cause followed by sepsis 13 (13.7%) in direct causes of maternal deaths.

Conclusions: The present study was carried out with view to determine various factors and causes of maternal deaths, utility of medicolegal autopsy and autopsy record as a useful and adjunct data source for ascertainment of maternal deaths and elucidating the emerging trends. Some special cases are discussed with the help of medicolegal knowledge, which point out fallacies while treating these cases such as proper use drugs, surgical procedures while dealing with cases of abortion and ectopic gestation, sterilization operations etc.

Keywords: Death, Maternal mortality, Medicolegal autopsy, Pregnancy

INTRODUCTION

Pregnancy and childbirth is a universally celebrated event yet for many thousands of women that may end in death, during or after her pregnancy. This leads to extreme strain over her family dynamics and questions about the death that need to be addressed by the health care providers.

If this anger that is part of the grieving process is not adequately resolved, healing cannot occur. It is then that the family may pursue the legal process to help obtain

answers about what happened and, more importantly, why it happened to their loved one.

Maternal mortality in present time defined as "Death of any woman while pregnant or within forty-two completed days of termination of pregnancy irrespective of duration or site of pregnancy from any cause related to or aggravated by pregnancy but not from accidental or incidental causes".¹ Maternal mortality rate is defined internationally, as the maternal death rate per 1, 00,000 live births. Maternal death is an important indicator of the reach of effective clinical health services to the poor, and

is regarded as one of the composite measure to assess the Country's progress.

Despite the improved methodology, global database on maternal mortality remains weak. The present study was undertaken with a view to determine factors causing maternal deaths, elucidating the emerging trends and to discuss the utility of medicolegal knowledge in ascertainment of maternal deaths. Hence forensic pathologist plays important role in identifying these cases with appropriate cause of death.

METHODS

All medicolegal cases of maternal deaths referred to Dept. of Forensic Medicine, LTMMC and GH, Sion Mumbai during period of 2 years from August 2012 to July 2014 were studied.

During this period, total 95 cases were autopsied. All maternal death cases, including brought dead and indoor cases strictly as per definition of maternal deaths were included. Any pregnant female death associated with incidental or accidental cause and late maternal death after 42 days of delivery was excluded from the study.

All cases underwent detailed examination with special reference to maternal death and also on guidelines of royal college of Landon for maternal death. The autopsy records with clinical notes were analyzed; gross and histopathology specimens and slides were studied to establish the accurate cause of maternal deaths.

RESULTS

In the present study as per, 44(46.3%) cases were delivered by normal vaginal delivery and 29(30.5%) by lower segment caesarian section Table 1.

Table 1: Distribution of maternal deaths by type of delivery.

Delivery related Variables n = 95			
	No. of cases	%	
Type of delivery	Abortion	3	3.2
	Forceps	1	1.1
	LSCS	29	30.5
	Normal	44	46.3
	Rupture of ectopic	5	5.3
	Un-delivered	13	13.7

Table 2: Distribution of maternal deaths by place of Delivery.

Delivery related variables n = 95			
	No. of cases	%	
Place of delivery	Home	4	4.2
	Hospital	72	75.8
	Nil	19	20.0

72(75.8%) cases had institutional delivery while rest 4(4.2%) cases delivered at home Table 2. 87(91.6%) cases died in hospital, 7(7.4%) cases died during transport to hospital or higher center Table 3.

Table 3: Distribution of maternal deaths by Place of death.

Delivery related variables n= 95			
	No. of cases	%	
Place of death	During transport	7	7.4
	Home	1	1.1
	Hospital	87	91.6

Table 4: Distribution of maternal deaths by Period of death.

Delivery related variables n= 95			
	No. of cases	%	
Period of death	ANC	22	23.2
	PNC	72	75.8
	Delivery	1	1.1

Table 5: Distribution of maternal deaths by type Death Interval in PNC cases.

Delivery related variables n = 95			
	No. of cases	%	
Death interval for PNC cases	< 1 day	20	27.8
	1 - 3 days	15	20.8
	4 - 7 days	15	20.8
	> 7 days < 42 days	23	31.9

Table 6: Distribution of maternal deaths by operative procedures done.

Delivery related variables n = 95			
	No. of cases	%	
Operative procedures done	Abortion	2	2.1
	Exploration	8	8.4
	LSCS	23	24.2
	Rupture repair	4	4.2
	Nil	58	61.1

Number of deaths during PNC period were 72(75.8%) whereas during ANC period 22(23.2%) and 1(1.1%) during delivery respectively (Table 4). Maximum number maternal deaths 23(31.9%) occurred during postnatal period of greater than 7 days and less than 42 days, whereas 20(27.8%) died within 24 hours of delivery (Table 5). 23(24.2%) cases were operated for lower segment caesarian section for delivery of baby, 8(8.4%) cases were operated for exploration, 4(4.2%) cases had undergone rupture repair for ectopic pregnancy and rupture of uterus, and in 2(2.1%) D and C was performed in view of abortion Table 6. Out of 85 cases with direct cause of maternal death, maximum cases 19(20.0%) died

due to postpartum hemorrhage, 13(13.7%) septicemia, followed by pregnancy induced hypertension 8(8.4%). Out of 10 cases with indirect cause of maternal death, 4(4.2%) hepatitis, 2(2.1%) pulmonary tuberculosis, 2(2.1%) severe anemia, 1(1.1%) rheumatic heart disease and 1(1.1%) abdominal Koch's Table 7.

Table 7: Causes of maternal death.

Cause of death	No. of cases	%
Direct causes (n=85)		
Post partum hemorrhage	19	20.0
Septicemia	13	13.7
IC bleed	8	8.4
Pregnancy induced hypertension	8	8.4
Antepartum hemorrhage	7	7.4
Rupture of uterus	7	7.4
Ectopic pregnancy	6	6.3
Amniotic fluid embolism	4	4.2
DIC	4	4.2
Abortion	3	3.2
Hellp syndrome	2	2.1
Wound dehiscence	2	2.1
Drug reaction	1	1.1
Injection abscess and gas gangrene	1	1.1
Indirect causes (n= 10)		
Hepatitis	4	4.2
Pulmonary tuberculosis	2	2.1
Severe anaemia	2	2.1
Rheumatic heart disease	1	1.1
Abdominal tuberculosis	1	1.1
Total	95	100.0

DISCUSSION

Reducing maternal morbidity and mortality is of global concern and prime healthcare goal in developing countries. Maternal Death Review (MDR) is an approach advocated by the WHO to scrutinize practices and outcome of delivery at health facilities and in the community. It analyses deaths and its factors at all levels and is divided into Facility based and community based maternal death review. Understanding of the changes and recent trends in the epidemiology of maternal deaths is important in this regard.

In the present study, 44(44.6%) cases had normal vaginal delivery, 29(30.5%) delivered by lower segment caesarian section, 5(5.3%) cases were of ruptured ectopic gestation, 3(3.2%) cases had abortion and 1(1.1%) case delivered by application of forceps. Undelivered constituted 13.7% of the cases (Table no 1). This is in accordance with studies of Anjali Mundkur and Lavanya Rai et al, Puri Alka et al, Kullima et al, K.Padmaleela, Vimala who reported maximum cases with normal vaginal deliveries, followed by LSCS, and other cases as post abortion deaths.²⁻⁵

In our study, 75.8% cases had institutional and hospital deliveries whereas 4.2% cases delivered at home (Table 2). Kullima et al and Ann L Montgomery et al similarly reported higher cases of institutional deliveries. Higher percentage of institutional deliveries conducted by well trained personnel has always been the target of health sector to reduce the maternal mortality.^{4,6}

In the present study, 91.6% cases died in hospital, 7.4% cases died during transport to higher centres and rest 1.1% case died at home (Table no 3). Ann L Montgomery et al reported similar findings in their study with maximum number of cases dying in hospital and 13.8% cases during transport.⁶ Death of pregnant lady during transport to the higher center for specialty treatment has always been a matter of concern and it concludes that there is a shortage of well-equipped transport facility and trained personnel.

With respect to admission to Death interval (Table 5), Surat Zaman and Anjuman Ara Begum, Neelam Anupama Tappo et al, Verma Ashok and Minhas Santosh, Paul et al, Shoba Mukharjee et al and Ratan Das et al reported consistent findings with present study.⁷⁻¹² The present study was carried out at a higher tertiary care center and teaching institute which shears maximum burden of complicated referred cases from other hospitals.

In the present study, it is observed that 85(89.4%) cases died due to direct causes of maternal deaths and rest 10(10.5%) cases died from indirect causes. Ratan Das et al, Ann L montgo-mery et al and Pravin N Yerpude et al reported consistent findings with present study.^{6,12,13} Out of 85 cases with direct cause of maternal death, classical triad of postpartum hemorrhage or obstetrical hemorrhage 19(20.0%), septicemia or sepsis 13(13.7%), pregnancy induced hypertension or eclampsia 8(8.4%) constituted major death toll. These findings are consistence with the findings of Pravin N Yerpude et al, Ann L montgo-mery et al and Ratan das Et al. Out of 10 cases with indirect cause of maternal death, 4(4.2%) cases died due to hepatitis, followed by pulmonary tuberculosis and severe anaemia 2(2.1%), and 1 died due to rheumatic heart disease and abdominal Koch's each.^{6,12,13} These findings match with the findings of S.K. Gumanga and Pankaj Shah et al.^{14,15}

Specific cases with reference to Medico-legal point of view

A 27-years-old female with missed periods for 2 consecutive months for which consulted to private doctor and confirmed her pregnancy. She was diagnosed as dual pregnancies; one intrauterine and other ectopic. For which she was advised to undergo MTP and got admitted in the same hospital. Treatment was started with high doses Injection Methotrexate after D and C for uterine pregnancy without injection Leucovarin as specific antidote for ectopic pregnancy. On 4th day she developed

genital ulceration followed by oral mucosal involvement, ocular conjunctival injection and facial puffiness. She also suffered with severe vomiting and malena, for which she was treated with Injection Vancomycin, Injection Meropenam, and Injection Dexamethasone. As her repeat WBC counts decreased to $300/\text{cm}^3$ and platelets to $85,000/\text{mm}^3$; so she was referred to our tertiary care hospital. Doctors stopped methotrexate and treated her as case of methotrexate toxicity.

During treatment her serum Methotrexate level was done which was found significant above the therapeutic level. All necessary medication and references from other department was done in view of Methotrexate toxicity. In spite of all measures patient could not be survived and was declared dead, and medicolegal autopsy was conducted. Findings were conformed on post mortem examination and histopathological findings were positively correlated. Bone marrow was depressed with pancytopenia which methotrexate is known to cause at higher doses. High serum Methotrexate level with consistent finding on autopsy confirms death due Methotrexate toxicity, hence relatives of deceased loaded the complaint against private practitioner for negligence in treatment.

A 35 years old uneducated lady was pregnant after sterilization operation which was performed in sterilization camp in government primary healthcare center. She was unaware of her pregnancy and delivered dead born fetus without any assistance while she was working in the farm. After some days she landed in puerperal sepsis and died by the same. Medico-legal autopsy was performed in our department and findings were confirmed. Such type of maternal deaths is avoidable one with proper selection of surgical procedure and surgical care while performing sterilization surgeries.

A 30 years old female with approximate 12 to 14 weeks of gestation, underwent D and C in government hospital to terminate the pregnancy. During the procedure sustained visceral injury and developed perforation peritonitis. On the next day exploratory laparotomy was done in view of perforation peritonitis. On 8th day she died due septicemia following perforation peritonitis. Such type of deaths account for iatrogenic causes of maternal deaths which are avoidable.

A 30-year married female consulted at private hospital after she missed her period to terminate the pregnancy, for which she was prescribed MTP pills without doing any investigation. After 17 days, she started severe pain in abdomen for which she consulted the same hospital. Then she was referred to our hospital in view of non-availability of ultrasound facility and emergency operation theatre.

She was admitted to our hospital and died within half an hour of admission. Post-mortem examination was performed to know the cause of death, as death was

sudden and unexpected. Surprisingly post-mortem examination revealed hemoperitoneum with about 4 liters of blood with blood clots. On searching for bleeder, rupture of ectopic gestation in middle of left fallopian tube with products of conception was noticed.

With proper investigation and high index of suspicion of ectopic gestation such type of deaths is avoidable. The fallacy in this case was giving MTP pills without knowing the site of pregnancy

CONCLUSION

The present study was carried out with view to determine various factors and causes of maternal deaths, utility of medicolegal autopsy and autopsy record as a useful and adjunct data source for ascertainment of maternal deaths and elucidating the emerging trends. Some special cases are discussed with the help of medicolegal knowledge, which point out fallacies while treating these cases such as proper use drugs, surgical procedures while dealing with cases of abortion and ectopic gestation, sterilization operations etc.

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REFERENCES

1. Park K. Text book of Preventive and Social Medicine, 23rd edition, Bhanarsidas Bhanot publication, 2015:557-61.
2. Mundkur A, Rai L. Prepare and prevent rather than repair and repent: Study of maternal mortality in tertiary care hospital. Internat J Medic Public Health. 2013;3(3):163-7.
3. Puri A, Yadav I, Jain N. Maternal mortality in an urban tertiary care hospital of North India. J Obstet Gynecol India. 2011;61(3):280.
4. Kullima AA, Kawuna MB, Audu BM, Usman H, Geidam AD. A 5 year review of maternal mortality associated with eclampsia in tertiary institution in northern Nigeria. Annals of African Medicine. 2009;8:81-4.
5. Padmaleela K, Thomas V, Prasad V. An Analysis of the Institutional Deliveries and Their Outcomes in Government Teaching Hospitals of Andhra Pradesh, India. Int J Health Sci Res. 2013;3(5):76-81.
6. Montgomery AL, Ram U, Kumar R, Jha P. Maternal mortality in India: Causes and healthcare service use based on a nationally representative survey. India

- maternal mortality: causes, Healthcare use. 2014;9(1):e83331
7. Surat Z, Ara BA. Maternal mortality at a rural medical college of Assam: a retrospective study. *J Obstet and Gynaecol. Barpeta.* 2014;1(1)46-51.
 8. Toppo NA, Nayak S, Kasar P, Sahu B. Maternal deaths review: an approach towards improving maternal health. *J Evol Med Dent Sci.* 2014;3(53):12316-27.
 9. Verma A, Minhas S, Sood A. A study on Maternal Mortality. *J Obstetr Gynecol India.* 2008;58(3):226-9.
 10. Paul B, Mohapatra B, Kar K. Maternal deaths in a tertiary health care centre of Odisha: An In-depth study supplemented by verbal autopsy, *Ind J Commun Med.* 2011;36(3):213-6.
 11. Mukherjee S, Mukherjee S, Sarkar RR. A six-year retrospective study of maternal mortality at a tertiary teaching institute in Uttar Pradesh. *Internat J Medic Sci Public Health.* 2014;3(1):1407-9.
 12. Das R. Maternal mortality at a Teaching Hospital of Rural India: A retrospective study. *Age.* 2014;19(79):30-85.
 13. Yerpude P, Jogdand K. A 5 year retrospective study of pattern of maternal mortality in a tertiary care hospital in South India. *Internat J Recent Trends Sci Technol.* 2014;11(3):310-2.
 14. Gumanga SK, Kolbila DZ, Gandau BBN, Munkaila A. Trends in maternal mortality in Tamale teaching hospital, Ghana. *Ghana Med J.* 2011;45(3)3:105-10.
 15. Shah P, Shah S, Kutty RV, Modi D. Changing epidemiology of maternal mortality in rural India: time to reset strategies for MDG-5. *Tropical Medic Internat Health.* 2014;19(5):568-75.

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