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CLINICO-PATHOLOGICAL CO-RELATION OF MATERNAL DEATHS IN A TERTIARY CARE CENTRE, SOUTHERN MAHARASHTRA

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ABSTRACT

Introduction: Maternal mortality is an indicator of the quality of obstetric care in a community directly reflecting the utilization of health care services available. This study was conducted to study pathogenesis and morphological changes in various organs with clinic-pathological co-relation of maternal death in rural areas of south Maharashtra.

Methodology: A retrospective study of all the cases of maternal deaths that underwent a pathological autopsy in tertiary health care centre from January 2009 till June 2014.

Results: Out of 93 eligible cases 73.11% died due to direct obstetrics causes, 24.84% died due to indirect causes and in 2 cases the cause was unknown. Hemorrhage from genital tract (31.18%) followed by pregnancy induced hypertension (15.05) were the common causes of maternal mortality; while indirect causes like anemia also contributed to the maternal deaths.

Conclusion: Direct obstetric causes like hemorrhage from genital tract in previously anaemic patients were the most common cause of death in our study thus intensive efforts with proper health education need to be taken in these areas to have good healthy mothers with minimum complications and reduce the maternal mortality in developing countries like India.

Keywords: Maternal deaths, Hemorrhage, Pregnancy induced hypertension, Anemia

INTRODUCTION

A maternal death is defined as death of a woman occurring while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or its management but not from accidental or incidental causes [1]

Maternal mortality is an indicator of the quality of obstetric care in a community directly reflecting the utilization of health care services available[2]. It differs from place to place, country to country and institute to institute reflecting the type of care provided and health status of the region. Maternal mortality has been higher in developing countries than in developed countries.

The World Health Organization reports that the MMR in the South Asian region ranks second only to sub-Saharan Africa[1]. Together, these two regions account for 86% of global maternal deaths. The causes of maternal deaths have been classified as direct (resulting from obstetric complications of pregnancy, labor or puerperium) or indirect (resulting from preexisting disease or disease aggravated by the physiological effects of pregnancy) depending upon their relationship with pregnancy[3]. This classification, however, depends on accurate establishment of the cause of death by a patho-

logical autopsy correlated with the clinical diagnosis.

The maternal mortality rate in India is very high as compared with developed countries [4].India ranks 3rd in the world for maternal death (19%). According to the Registration report of the Registrar general of India the maternal mortality rate in 2007-09 is 212/100000 live birth [5]. The major causes of maternal mortality in India are anemia (64.4%), pre-eclamptic toxemia / eclampsia (25.5%), sepsis (20.6%) and hemorrhage (19.8%) [6]. Maternal death indicates social status of the country. It is every nation's dream to reduce maternal death. Studies of maternal deaths are essential so as to help in achieving the goal of reducing maternal mortality to less than 100/100000 live birth. An efficient system is needed to monitor proper functioning of antenatal clinics, delivery centres and post natal care centre to decrease maternal mortality. Hence the present study was undetrtaken to find out the histopathological changes, associated disorders and clinico-pathological co-relation of maternal deaths in rural areas of Maharashtra.

MATERIALS AND METHODS

The present study was conducted at RCSMG Medical College and CPR hospital, Kolhapur after approval from the Institutional Review Board. The numbers of maternal mortalities from January 2009 to July 2014 were recorded. All the cases of maternal deaths autopsied by the pathology department were included in the study. Our department is referral center for histo-pathological examination of tissues from rural areas of Kolhapur district hence in some of the cases we received pieces of organs in formalin sent to the department with accompanying clinical history, laboratory investigations if done and post mortem findings from the retrospective hospitals. Medico-legal autopsies were excluded from the study. The need for pathological autopsy in each case was determined by the treating obstetrician. Gross and histopathological examinations were done on all the organs. Special stains like Zeil- Nielson, Prussian blue were also done wherever necessary.

RESULTS

We analysed 97 cases of maternal death. In 4 cases all organs received were completely autolysed. Hence a total of 93 cases of maternal death were correlated with clinical history, investigations and post-mortem findings to know the pathogenesis.

There were 49 cases in 19-25years age group, 35 cases in 26-30 years and 13 cases in age group above 30 years.

Table 1 Causes of maternal death

Cause	Cases (%)
Direct Cause	**68 (73.11)**
Hemorrhage	29 (31.18)
Pre-eclampsia Eclampsia	14 (15.05)
Intrauterine Death	15 (16.12)
Puerperal Sepsis	3 (3.22)
Retained Placenta	4 (4.30)
Uterine Rupture	2 (2.15)
Uterine Inversion	1 (1.07)
Indirect Causes	**23 (24.84)**
Fever	7 (7.5)
Anemia	6 (6.45)
Sickle cell anemia	1 (1.07)
Tuberculosis	4 (4.30)
Hepatitis	2 (2.15)
Heart Disease	2 (2.15)
Diabetes Mellitus	1 (1.07)
Unknown Cause	**2 (2.15)**
Total	**93 (100)**

Table shows causes of maternal death. In some of the cases there were more than one clinical presentation

Mode of death and morphological findings associated with terminal event

DIRECT CAUSES

Pre eclampsia/eclamsia: Morphological changes noted in various organs. In Lungs there was Pulmonary edema (PE) (n=3), Interstitial Pneumonia (n=6), pulmonary hemorrhage (n=3), Lobar Pneumonia (n=1), Central venous congestion (CVC) (n=1) .In Heart, Rheumatic heart disease (RHD) (n=1)was noted in single case. In Liver, there were changes of Portal triaditis (n=2), fatty change (n=2), Hepatitis (n=1), Midzone necrosis (n=1), Centrilobular necrosis (n=1). Spleen showed hemorrhage (n=1)in one case. Kidney showed Acute tubular necrosis (n=1), Interstitial nephritis (n=1), Hemorrhage (n=1), Chronic pyelonephritis (CPN) (n=1). Brain showed hemorrhagic Infarct (n=1), Encephalitis (n=1). Uterus showed myometritis (n=2).

Hemorrhage: Morphological changes noted in various organs. Lungs showed Pulmonary edema (n=1), Interstitial Pneumonia (n=7), Pulmonary hemorrhage (n=1), Lobar Pneumonia (n=1), CVC (n=1),Infarct (n=1). Heart showed Myocarditis (n=2). Liver showed Portal triaditis (n=5), Midzone necrosis (n=1), CVC (n=1).In spleen there were changes of CVC (n=2) in 2 cases. Kidney showed Hemorrhage (n=1) and Infarct (n=1). Uterus showed Myometritis (n=4).Incidental finding in thyroid was Follicular Variant of Papillary thyroid carcinoma in one case.

Intrauterine Death: In Lungs there were changes of Pulmonary edema (n=1), Interstitial Pneumonia

(n=4), pulmonary hemorrhage (n=1), Lobar Pneumonia (n=1), Infarct (n=1), Adult respiratory distress syndrome (ARDS) (n=2).Heart showed Myocarditis (n=1).Liver showed Portal triaditis (n=2)and Spleen showed CVC (n=4) changes. Kidney showed Infarct (n=1), CPN (n=1) and Uterus showed Myometritis (n=1). Intestine should Gangrene (n=1) and caecal Tuberculosis (TB) (n=1). In one case we found microabscesses in brain, lung, heart, liver, Spleen and kidney.

Uterine Rupture: We found uterine rupture in two cases of which in one case lung, liver and spleen showed congestion and in other case there was interstitial nephritis.

INDIRECT CAUSES

Anemia: In lungs there are changes of Pulmonary edema (n=1), Interstitial Pneumonia (n=2), Infarct (n=1) and CVC (n=2).Liver showed portal triaditis (n=1) and CVC (N=2).Spleen showed CVC (n=2) changes. Kidney showed Infarct (n=1), Hemorrhage (n=1), Tubulointerstitial nephritis (n=1) and single case of Peritonitis (n=1). There was one case of sickle cell anemia which was not diagnosed antenatally. On HPE vaso-occlusive crisis due to sickle RBCs was seen in all organs along with placental bed.

Tuberculosis: There were four cases of tuberculosis, out of which one showed tuberculous pneumonia, one case showed caecal tuberculosis and lobar pneumonia and two cases showed miliary tuberculosis involving all the organs.

Jaundice: There were two cases of jaundice, one of which was associated with uterine rupture while other case showed pulmonary edema and necrosis of hepatocytes.

Heart Disease: One case had congenital heart disease i.e Ventricular septal defect (VSD) and autopsy findings showed VSD with right ventricular hypertrophy in heart and pulmonary hemorrhage, PE and IP in lungs. Another case was of RHD with MS and had CVC lungs along with interstitial fibrosis.

DISCUSSION

Maternal mortality reduction has been the topmost priority for the international community. The Millennium Development Goals [7] and the WHO [1] 'Make every mother and child count' initiative describe the importance of maternal mortality reduction as a healthcare issue. A recent systematic review of the causes of maternal mortality and its geographic distribution has shown that the Indian subcontinent has a significantly higher maternal mortality attributable to sepsis, infection and hemorrhage.[8]

Hence we decided to conduct this autopsy study to analyze the causes and pathological basis of maternal deaths at a tertiary care centre in R C S M G M C, Kolhapur, Maharashtra. In our hospital, most of the patients are from rural areas of Kolhapur district some of these patients are not having ANC registration and are already in complicated stages when they are referred.

Table 2: Comparison of causes of maternal deaths in various studies

	Direct Causes	Indirect Causes	Coincidental Causes
Kavatkar et al [13]	49.5	34.7	15.8
Panchabhai et al [16]	48.3	51.7	-
Jashnani et al [14]	38.2	53.9	6.7
Vasaikar et al [15]	50.9	47.3	1.8
Present Study	70.1	26.8	3.1

All figures in percentage

Table 2 shows comparison of causes of maternal deaths in various studies. In the studies done by Vasaikar et al [15] and kavatkar et [13] al direct obstetric causes of death were higher whereas studies done by Panchabhai et al [16] and Jashnani et al[14] indirect obstetric causes were higher. In our study contribution of direct obstetric causes of death was higher as in Vasaikar and Kavatkar et al.

There are many clinical studies of maternal deaths in India [6,9,10,11]. Autopsy study is helpful in knowing the pathogenesis and clinical correlation of the cause of death. There are few autopsy studies of maternal death in India [12, 13, 14, 15]. Most of these studies are done in metropolitan city like Pune, Mumbai. The health status of rural population is cause of great concern.

Table 3 illustrates causes of maternal deaths in various studies in India. It is seen that pregnancy induced hypertension followed by anemia was the main cause of death in Kavatkar et al[13] while in Panchbhai et al[16] pregnancy induced hypertension followed by haemorrhage from genital tract was the main cause of death. In the study done by Vasaikar et al[15] the major causes of maternal death were anemia (27.67%), preeclampsia/ eclampsia (23%), hemorrhage from genital tract (18.75%). In our study the major cause of maternal death was hemorrhage(29.89%) from genital tract, pregnancy induced hypertension(14.43%) followed by anemia(6.18%). According to Vasaikar et al[14] illiteracy, ignorance, early marriages, malnutrition is responsible for making anemia the main cause of maternal death in rural area.

Table 3: Illustrative causes of maternal deaths in various studies in India

Series	Kavatkar et al [13]	Panchbhai et al [16]	Jashnani et al[14]	Vasaikar et al[15]	Present Study
Study Period	1993-2000	1998-2006	2003-2007	2008-2012	2009- July 2014
Cause of death					
Pregnancy Induced Hypertension	24.2%	14.44%	13.4%	23.0%	14.43%
Hemorrhage from genital tract	8.4%	11.55%	5.6%	18.75%	29.89%
Septicemia	12.6%	5.78%	11.2%	1.7%	3.09%
Anemia	14.7%	2.89%	5.6%	27.67%	6.18%
Sickle cell anemia		2.89%	1%	5.3%	1.03%
Liver cell failure	14.7%	-	-	2.67%	2.06%
Tuberculosis	4.2%	-	2.25%	0.8%	4.12%

In our study anemia was seen in all of our cases but anemia of severe degree contributing to death was seen in 6.18% cases. Hemorrhage including antepartum hemorrhage because of abruptio placenta and placenta previa and post partum hemorrhage in already known cases of anemia was the major direct obstetric cause of death.

Maternal deaths due to intrauterine fetal deaths (15.46%) showed various histomorphological features such as pneumonia, infarct, haemorrhage and ARDS in lungs, intestine gangrene and a case with multiple microabscesses in all organs.

We had one case of vaso-occlusive crisis due to sickle cell anemia responsible for death.

In study done by Panchabhai et al autopsy revealed high number of deaths attributed to infectious diseases (27 of 277) , cardiovascular diseases (27 of 277) and tuberculosis (26 of 277). Such high number have not been reported in other studies [13,14] . We had only 4 cases of tuberculosis followed by 2 cases of heart disease (1 case of RHD and 1 of VSD).

The present study provides detailed pathological analysis of maternal mortality in a tertiary care centre over five and half years. Though every attempt was made to determine the most likely diagnosis on autopsy, many cases presented with findings suggestive of multi-organ dysfunction. In such cases, the most evident gross and histopathology findings correlated with the clinical presentation was considered as the cause of death. There are many national programs which are meant for reducing the maternal death. But unawareness and under utilisations of these programs are responsible for making Anemia the main cause of mortality in rural areas. This could have been easily prevented by doing regular antenatal check up and required maternal services. Also many patients are referred from rural areas in their terminal stages of pregnancy with complications like haemorrhages/ bleeding. In these cases obstetrician are also helpless in avoiding these deaths as haemorrhagic shock is already established in anaemic patients.

CONCLUSION

Autopsy was performed on 97 maternal deaths, 4 cases excluded as organs were completely autolysed. Out of 93 cases 73.11% (68 cases) died due to direct obstetrics causes and 24.84(23 cases) died due to indirect causes. The most common causes of maternal mortality were haemorrhage from genital tract (31.18 %) followed by pregnancy induced hypertension (15.05%) in previously anaemic patients. Training in emergency obstetric care should percolate from doctors to interns, house surgeons, residents and health guides too.. Proper health education creating awareness in community about health of women, routine iron and folic acid supplementation will give us healthy mothers and will reduce maternal mortality.

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