Original Article

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Study of Paediatric Autopsies: An Endeavour to Improve Clinical Care in Rural Settings

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Abstract

Background: To know why India has failed to achieve Millennium Development Goal (MDG) 4. This aims at reducing U5MR by two- third between 1990-2015. *Aim*: To know the cause of paediatric death in North Maharashtra (Khandesh region) with 70% of Rural population. Measures to be taken to achieve MDG 4. To achieve clinico-pathological correlation in the cause of paediatric death. *Material and Methods*: A total of 124 cases were received for histopathological examination in the period of three year span from January 2014 to December 2016. 4 cases were completely autolysed. Hence 120 cases were included in the study. 9.6% cases belonged to neonatal age group, in whom perinatal asphyxia was the common cause. 15.3% belonged to infant and 71.7% belonged to childhood deaths. In both the age group, infection 78% was the main cause of death. On clinical correlation 16.6% discrepancy was present in neonate, 5.2% in infant and 4.4% in childhood. Medico-legal cases were seen in adolescent age group. *Results*: Prolonged labour and home delivery was the reason for perinatal asphyxia, which was the main cause of perinatal death in our study. Hence a good obstetric care in primary health centre along with educating mother is need in rural India. Effective intervention will be helpful in decreasing the mortality due to infection in infant and childhood deaths. Educating teenagers for hormonal changes is important in rural area too. Thus an autopsy study of paediatric deaths is informative and it can form baseline information for Promise of Renewal Movement.

Keyword: Millennium Development Goal (MDG) 4.

Introduction

Autopsy has traditionally been considered as a means in determining the cause of death. It plays a major role in medical care [1]. It helps us to improve our health services. Hence the present study was undertaken to know the cause of Pediatric deaths occurring in North Maharashtra (Khandesh region). This region has 70% of its total population living in rural areas and it is an endemic zone for sickle cell anaemia.

The present study will help us to know the causes of paediatric death in rural population. How it differs from urban population? Why the Under five mortality rate (U5MR) of rural Maharashtra (per 1000 live birth) is 18? Why India has failed to achieve Millennium Development Goal (MDG) 4, which aims at reducing U5MR by two-third between 1990-2015 [2]. In this study we have also included medicolegal cases, which had cost the child's life. Any discrepancy between antemortem and post mortem diagnosis was evaluated wherever possible.

Materials and Method

Our Department is the centre for histopathological examination of autopsies done in various health centres of North Maharashtra Khandesh region. Autopsies done in our institute are also received for histopathological study.

Tissues from Lungs, Liver, Spleen, Kidneys, and Brain along with whole heart are received in 10% formalin. The specimens are accompanied by clinical history and Post Mortem report.

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Grossing of the tissues is done in the department. The whole heart is studied for congenital anomalies. Paraffin embedded tissue sections are cut and stained with haematoxylin and eosin. Special stains like PAS stain, Ziehl- Neelsen stain are done wherever needed.

Retrospective studies of 124 Pediatric autopsies received in 3 year span from January 2014- December 2016 were studied. Autopsies of Day 1 to 18 years of age were included in the study. The histopathological slides along with clinical and post mortem findings were reviewed by three pathologists. Clinico-Pathological correlation was done to arrive at the cause of death, according to the availability of data.

Results

During the three years span, we received a total of 1194 cases of autopsies for histopathological examination, out of which 124(10.3%) cases were paediatric autopsies. The organs of 4 cases were received completely autolysed. Hence 120 cases were included in the study.

There were 12 (9.6%) cases which belonged to neonatal age group, 19 (15.3%) cases of infant age group and 89 (71.7%) cases of childhood deaths. The sex distribution was 74 males and 46 females.

The common cause in neonatal death (Table 1) was perinatal Asphyxia 4 cases (33.3%).The cause of perinatal asphyxia in 2 cases was prolonged labour and home delivery, while there was history of eclampsia in one case and meconium aspiration (Figure 1) in other case.

The premature cases showed diffuse alveolar damage along with hyaline membrane formation. Pneumonia (Figure 2) was diagnosed, while neonatal hepatitis was missed clinically. There was a case of Persistent truncus arteriosus, which was impossible to diagnose clinically due to rural setting. Thus the discrepancy between ante-mortem and post-mortem diagnosis in neonate was seen in two cases (16.6%). In one case there were no abnormal findings detected on histopathology, while in medico legal case, it was an assault by drunken father.

In Infant (Table 2), maximum i.e. 15 cases (78%) were of infective etiology, lower respiratory tract 13 cases (67.5%) dominated the list. The clinical details available were high grade fever. Three cases presented with sudden unexpected infant death. On histopathological examination one case showed vaso-occlusive sickle cell crisis, while in two cases no abnormalities were seen. Patient of Niemann Pick disease was admitted for hepatic encephalopathy. In Infant too discrepancy was seen in two cases (5.2%).

There were 89 cases (71.7%) of childhood deaths (Table 3). There was good clinical correlation in all infective cases (70 cases), as well as in Nutritional anaemia, sickle cell crisis and Leukaemia (Figure 3 and 4). A case of Guillain- Barre syndrome and Rabies showed classic presentation clinically. However on histopathology it was difficult to prove because of inadequate sample. Eosinophilic pneumonia was an incidental finding. Diffuse alveolar damage along with Aspergillosis was seen in bed ridden patient with surgical complication. Thus the discrepancy was seen in four cases (4.4%).

Table 1: Causes of Neonatal (birth to 1 month) death (N= 12)

Causes of Death	No. of Deaths	%
Perinatal asphyxia	4	33.3%
Prematurity	2	16.6%
Pneumonia	2	16.6%
Neonatal hepatitis	1	.3%
Persistent truncus arteriosus	1	8.3%
Cause unknown	1	8.3%
MLC	1	8.3%
Total	12	100%

Table 2: Causes of Infant (month to 1 year) deaths (N= 19)

Causes of Death	No. of Deaths	%
Infective	15	78%
Pneumonia	11	57%
Interstitial pneumonia	2	10.5%
Meningitis	2	10.5%
Sickle cell crisis	1	5.2%
Niemann Pick disease	1	5.2%
Cause not known	2	10.5%
Total	19	100%

Table 3: Causes of childhood (2-18 years) deaths (N= 89)

Causes of Death	No. of Deaths	%
Infective	70	78%
Pneumonia	40	44.9%
Interstitial pneumonia	14	15%
Meningitis	8	8.9%
Pulmonary Tuberculosis	3	3.3%
Acute gastroenteritis	2	2.2%
Hepatitis	1	1.1%
Typhoid	1	1.1%
Cerebral Malaria	1	1.1%
Sickle cell crisis	3	3.3%
Nutritional anaemia	2	2.2%
Leukaemia	2	2.2%
Eosinophilic pneumonia	1	1.1%
Diffuse alveolar damage with Aspergillosis	1	1.1%
Rabies	1	1.1%
Guillain- Barre syndrome	1	1.1%
Medico legal cases	6	6.7%
Cause not Known	2	1.1%
Total	89	100%

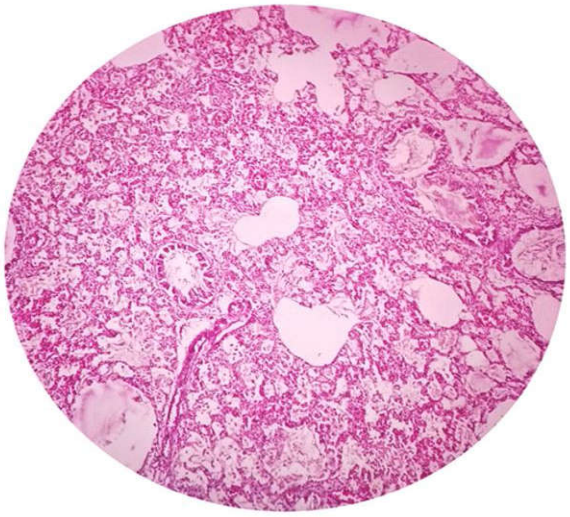

Fig. 1: H&E 10X Lung alveoli showing squames in meconium aspirate

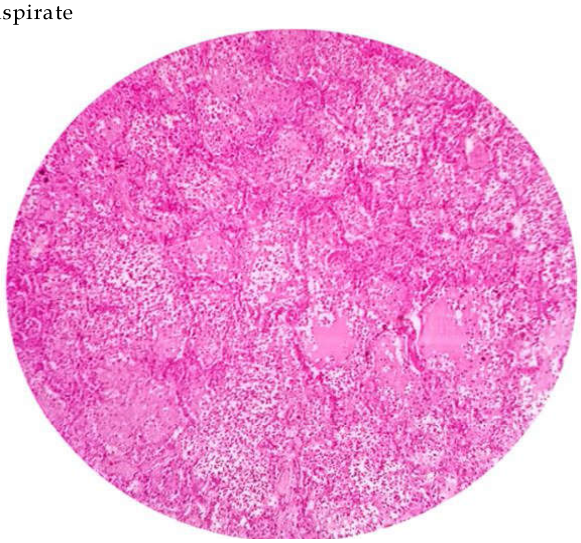

Fig. 2: H&E 10X Lung showing lobar pneumonia

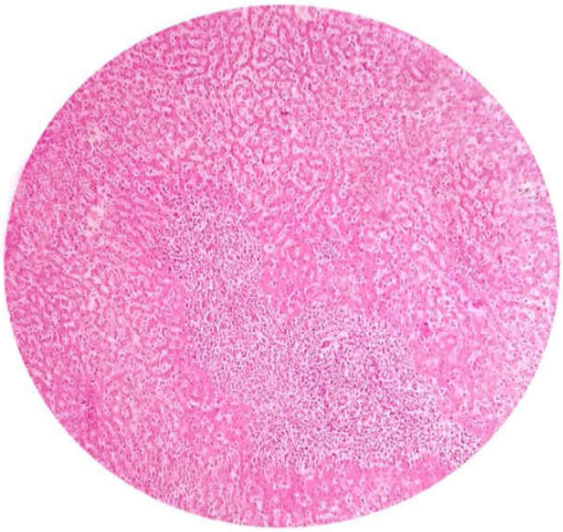

Fig. 3: H&E 10X Liver showing leukemic infiltrate

There were six medicolegal case, two cases were adolescent females with history of hanging, the remaining three cases were of burn injury due to fire cracker, snake bite, quarrel among friends leading to subdural haematoma respectively. All the cases were seen in males of adolescent age group. In two cases histopathology was not helpful in arriving at diagnosis.

Discussion

Most of the studies which were done in the past were focussed on neonate and Infant deaths. Very few studies have dealt with childhood deaths along

with adolescent deaths and their problems. The previous studies were done in urban institutes. These prompted us to undertake the present study, where 70% of total population of Khandesh region resides in rural area and are of tribal origin. The present study is a composite study of paediatric age group from neonate to adolescent age.

12(9.6%) cases were received of neonates. The common causes of deaths were perinatal asphyxia (33.3%), prematurity (16.6%) and infections (16.6%). According to the latest sample registration system [3] report Prematurity and low birth weight were the main causes of deaths followed by neonatal infections and birth asphyxia. There is marked regional variations in the leading causes of deaths across India. In central India Perinatal asphyxia and prematurity were the main causes of deaths [4]. In urban areas congenital anomalies contributes in larger proportion to neonatal causes of deaths than rural regions [5].

The cause of perinatal asphyxia in our study was due to prolonged labour and home delivery. Complications during labour and delivery are responsible for approximately a quarter of all deaths worldwide [6]. Lack of transport facilities in rural and remote areas are the major drawbacks in accessing antenatal services and emergency obstetric care in India [7,8]. Thus a good emergency care should be easily accessible and should be able to treat the complications at primary health centres. Even if such facilities are available, there is delay in seeking care due to ignorance and illiteracy [9]. Thus educating mother is a dire need in reducing neonatal mortality.

78% of infant and childhood deaths were due to infections. In both the age groups pneumonia 57% in infant and 44.9% in childhood was the main cause this was followed by interstitial pneumonia in both the age groups. According to National representative mortality survey in India [4], 50% of deaths at 1-59 months were due to pneumonia and diarrhoea. Pneumonia was the common cause in our study; however diarrhoea was not the common cause. This may be due to limitation of our study, when the cause of death is certain it is not sent for histopathological examinations. Secondly histopathological examination is not useful in determining the causes of diarrhoea.

There were 3 (2.5%) cases, 2 (infant) and 1 (neonate) which showed no abnormal findings at autopsy. While Chittralekha P in her study of perinatal autopsy was unable to derive the cause of death in 9% of cases [10]. Failure to determine the cause of death may be due to autopsy not done by pathologist, or limitations of autopsy. The cause in these cases may be either metabolic cause or sudden unexpected death in infancy. According to M A Weber [11] in his study in determining the cause of sudden unexpected death in infancy, has concluded that identifiable specific cause of death can be established in only one third of cases even if the autopsies are done by paediatric pathologist with currently suggested guidelines.

Sickle cell gene is widely spread in all districts of North Maharashtra (satpuda range) [12]. We had 4 cases (1 infant and 3 childhood deaths) of sickle cell crisis. The infant was 9 month old belonged to Pawara tribal group. While the age of remaining children ranged from 6 to 13 years. They were diagnosed cases of sickle cell trait and belonged to Bhil community. The prevalence of sickle cell disease is very high among the Bhil and Pawara group [13]. The preceeding symptoms in children were fever, body ache (which may be joint pain). Extensive clinical study by Kar B C et al [14] noted that attack of pain; fever and anaemia were the predominant presenting features. In all the 4 cases capillaries of all the organs showed occlusion by sickle RBCS. Hence the terminal cause of death was put forward is vaso occlusive sickle cell crisis. Similar findings were seen by following authors too [15,16].

In medicolegal cases, death of neonate is self explanatory of ill effects of alcoholism. In adolescent age suicidal cases in females is due to sudden emotional nature which can occur due to hormonal changes [17].Thus sex education is a must in adolescent age.

Burn injury and assault can be explained by adventurous and rebellious nature seen in adolescent age group. Snake bite in farm is responsible for death of young and working population of our country. Thus an immense responsibility lies with parents to prevent such childhood deaths.

Conclusions

This retrospective autopsy study is done on moderate tissues received for histopathological examination. It lacks in situ and gross examinations done while performing the autopsy. However the findings presented in this review, provides us the burden of child deaths in rural India. It has helped us to identify causes of child deaths. Most of the causes are preventable and there are known cost effective interventions.

The present study will help us to achieve "A

PROMISE RENEWED" a global movement to end preventable child deaths by accelerating progress on maternal, newborn and child survival.

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