

**Original article**

## **Spectrum of Lung Pathology in Neonatal and Infant Medicolegal Postmortem**

**Dr. Meenal Shingade, Dr. Leena Nakate\*, Dr. Poonam Joshi**

Department of Pathology, B.J. Government Medical College, Pune.

Corresponding author\*

### **ABSTRACT**

**Introduction:** Autopsy plays very important role in establishing the identity, cause of death, time of death, antemortem, post-mortem nature of injury which is helpful in medicolegal cases. Autopsy is helpful to evaluate and correlate clinical findings with disease process. It also highlights pattern of disease processes in neonatal and infant deaths also.

**Aim:** To study the prevalence and pattern of lung diseases in medicolegal autopsies in neonatal and infant deaths confirmed by histopathological examination.

**Materials and Methods:** This retrospective study was carried out in the Department of Pathology. Tissue samples from lungs, retrieved at the time of autopsy of neonates and infants, were preserved in 10% formalin. These were processed and examined microscopically. A total of 223 viscera neonates and infants were received during period of 2016-2017 in Autopsy Section of Pathology Department of B.J. Government Medical College Pune

**Results:** Autolysed cases were excluded from study. Wide spectrum of microscopic findings were seen, the commonest being congestion seen in 113 cases (50%) and oedema seen in 56 cases(25%). Intra-alveolar haemorrhage was seen in 33 cases[14%]. There were 22 cases [9%] of Meconium Aspiration Syndrome (MAS). Other findings were Pulmonary Tuberculosis, Chronic Passive Venous Congestion, Abscess, partial Atelectasis and partially collapsed alveoli.

**Conclusion:** This study highlights various lesions in lungs in autopsies of neonate and infant deaths confirmed by histopathology, which were either incidental or direct cause of death. The short coming in present study was non receipt of whole organ or representative sample at the time of autopsy and lack of significant clinical history which if overcome will set much higher standard of autopsy reporting and would be a more useful tool in understanding cause of death and future management to prevent it.

### **INTRODUCTION**

Autopsy, the study of dead body which allow us to examine grossly all three cavities –cranium, thorax and abdomen. It gives opportunity to do histopathological examination of all organs. Autopsy study helps in understanding disease process and correlating clinical signs & symptoms with morphological findings. In medicolegal cases it helps to establish time of death, cause of death and antemortem & postmortem nature of crime. In era of the advancement in Modern Radiology like CT scan, MRI, PET scan, autopsy still remains valuable tool to study disease process. Neonatal and Infant death is a serious national issue. Study of neonate and infant autopsy specimen plays a very important role in understanding disease process and finding out cause of it, which may help in further national planning of neonatal and infant death control. There are many hardens while carrying out autopsy procedure like receipt of non- representative sample, improper preservation and transport particularly in medicolegal cases. Histopathology remains backbone to understand disease processes.

To find out the spectrum of Pulmonary involvement in neonate and infant death, we analyse viscera received in Department of Pathology from medicolegal infantile and neonatal post-mortem.

## MATERIALS AND METHODS

This retrospective study was carried out in the Department of Pathology, at B.J. Government Medical College, Pune, over a period of two years 2016-2017. All medicolegal autopsy cases of neonatal infant deaths received in Department of Pathology, were included in this study. Ethical clearance was not taken because of medicolegal nature of cases. A total of 223 cases of neonatal and infantile autopsy samples were received in the department. All these autopsies were performed by a forensic expert. Tissue samples from lungs were preserved in 10% formalin. These were then sent to our department along with whatever available history, clinical details and gross findings. In most of the cases we didn't get relevant and significant history. Tissue were processed for histopathological examination. All the histological sections were stained with Haematoxylin & Eosin stain and mounted. Ziehl-Neelson stain and Periodic Acid- Schiff (PAS) stain were also done, wherever necessary. Microscopic findings were recorded. Whatever available clinical details, gross and microscopic findings were correlated.

## RESULTS

A total of 223 viscera of neonatal and infant deaths were received during the period of study along with whatever available clinical details and autopsy findings. Histopathological examination was carried out in each case. Among these 223 cases, 3 cases which were autolysed were excluded from study. Age group included in this study was 0 to 1 year

Table 1. Age distribution of deceased Neonate and Infants in year 2016 & 2017

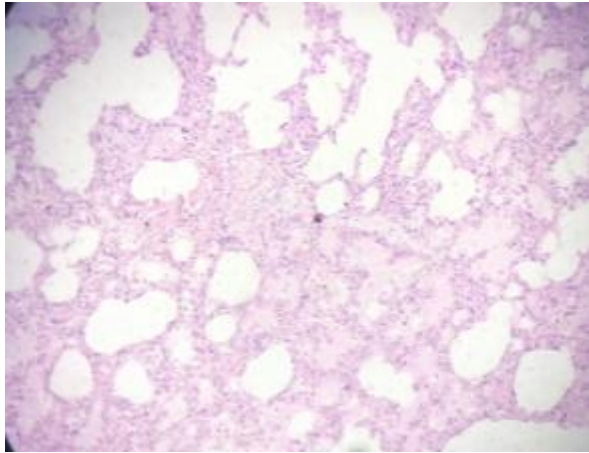
Year↓ Age→	0-1 Month	1-6 Months	6-12 Months
2016	54	40	23
2017	50	38	15

Table 2 - Spectrum of lung finding

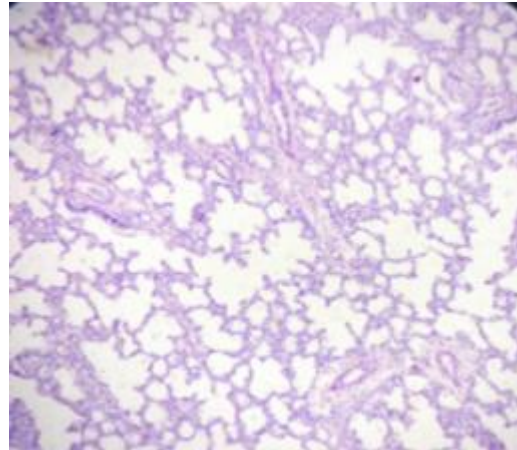
Lesions	Cases	Percentage
Congestion	113	50%
Pulmonary oedema	56	25%
Intra-alveolar Haemorrhage	33	14%
Meconium Aspiration Syndrome	22	9%
Pneumonia	40	17%
Other rare findings Pulmonary Tuberculosis Chronic Passive Venous congestion Abscess Partial atelectasis Partially collapsed alveoli		

Age distribution of neonate death in year 2016 was 45 neonates in 0-1 months group, 40 infants in 1-6 months group and 23 infants in 6-12 months age group as shown in table 1. In year 2017 there were 50 neonates in 0-1 months group, 38 infants in 1-6 months group and 15 infants in 6-12 months age group as shown in table 1.

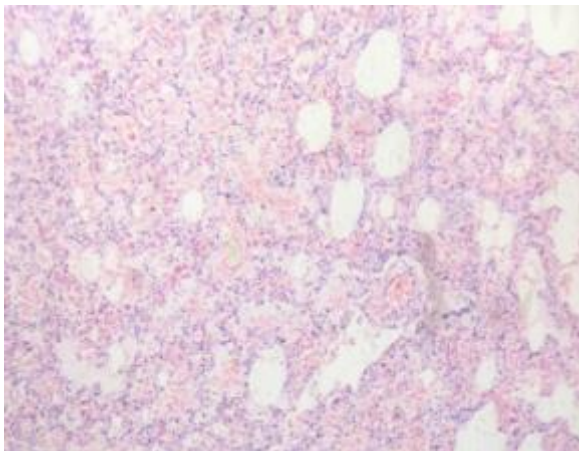
Wide varieties of microscopic findings were seen in lungs which included congestion (113 cases/50%), edema (56 cases/25%), intra-alveolar haemorrhage(33 cases/14%) , Meconium Aspiration Syndrome (9%) and Pneumonia (17%) as shown in table2. Other findings in the study were Pulmonary Tuberculosis, Chronic Passive Venous Congestion, Abscess, partial Atelectasis and partially collapsed alveoli.



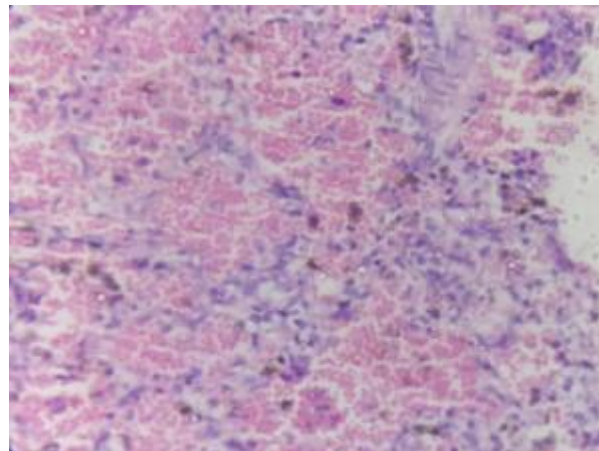
[Fig-1]: Oedema: pinkish fluid present in alveolar spaces and septae (H&E 10X).



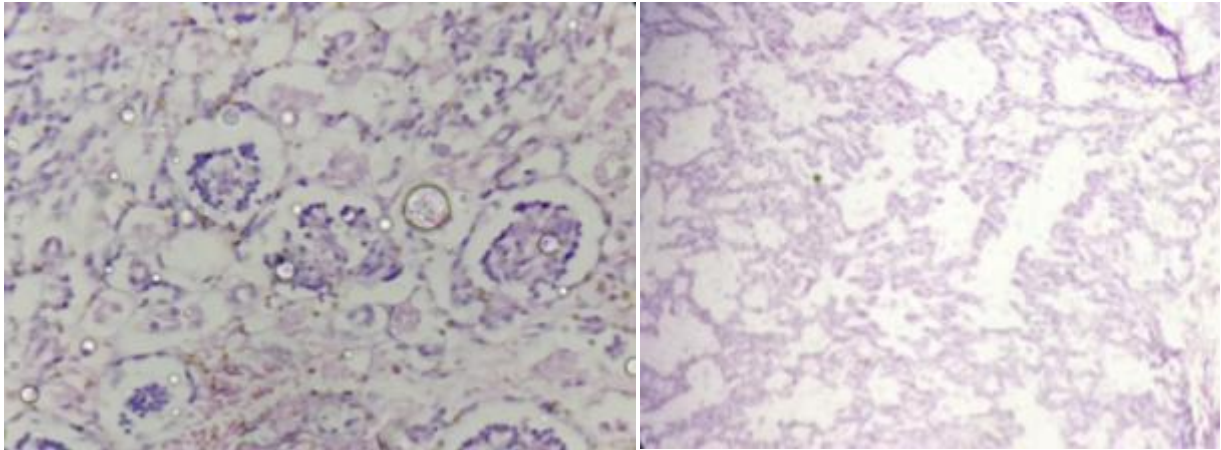
[Fig-2]: Congestion(H&E 10X).



[Fig-3]: Bronchopneumonia(H&E 10X). BP



[Fig-4]: Intra-alveolar hemorrhage (H&E 40X).



[Fig-5]: Meconium Aspiration Syndrome (H&E 40X). [Fig-6]: Partially collapsed alveoli (H&E 10X).  
MAS

## DISCUSSION

Medicolegal autopsies are a mandatory legal requirement in un-natural deaths. Consent from relatives of the deceased is not required to perform a medicolegal autopsy [1]. The facilities for medicolegal autopsies are available across all districts of country [3].

In our study, congestion and oedema was the commonest finding and was seen in 113 and 56 cases respectively. This was 50% of the total lung cases with pathological changes. This could be a death related change or secondary involvement of lungs in all forms of terminal events due to cardiovascular causes. Kandy NC et al., quoted that even in the era of high-tech medicine the autopsy remains an important tool for quality assessment of clinical diagnoses [5]. As far as lungs are concerned, these were normal in only 9.80% of the total number of autopsies in their series.

Bal MS et al., in their series of 150 cases had 19 autolysed sample and 11 cases with normal lung tissue [6]. Unlike their series we had much higher percentage of cases with no remarkable pathology. The very low number of autolysed samples in our series was probably due to availability of autopsy facilities in the hospital.

In this study, we came across 40 cases (17%) of acute pneumonia. Kandy NC et al., found 26.3% cases of pneumonia on histopathology of lung samples in their series of 51 cases [5]. Their study emphasized discordance in the diagnosis made on gross examination of lungs and final histopathological diagnosis at autopsy, particularly in cases of bronchopneumonia. Hunt CR et al., also had similar observations of discordance in the final diagnosis. However, we received only pieces of lungs for examination which could be from non-representative areas of lung. So we were unable to correlate with gross findings.

Granulomatous inflammation was seen in 3 cases in present series. Caseous necrosis and epithelioid cell granulomas were seen in all these cases, however only one was positive for AFB on ZN staining. Thus autopsy confirmed three cases having diagnosis of pulmonary tuberculosis. Similar results were seen in studies conducted by Garg M, et al., [11].

Only two autopsy sample showed features of ARDS in our series. Retrospective study conducted by Sachdev S et al., 125 lung autopsy cases over a period of three years, also observed low prevalence of acute respiratory distress syndrome (3.15%) [13]. Other authors also reported low incidence rate of ARDS in lung autopsies [14].

Twenty two cases of meconium aspiration syndrome was seen in our series. The hyaline membrane disease was seen in a preterm baby having gestational age six months and 18 days. Meconium aspiration syndrome was seen in a term infant of gestational age 40 weeks. Thomas S et al., in their prospective study on spectrum of respiratory distress in 1400 consecutive new-borns in North Indian population found that 116 cases developed respiratory distress [15]. Among these 116 cases, there were 10 cases of hyaline membrane disease and 14 cases of meconium aspiration syndrome. However, the post-mortem correlation could not be done as in many cases autopsy was refused. The study established that HMD was a disease of preterm (all 10 cases were preterm) and MAS was seen mostly in term babies (11 out of 14 cases were term babies).

#### **LIMITATION**

The short coming of the study was non receipt of whole organ or representative sample at the time of autopsy, which if overcome will set much higher standard of autopsy reporting and would be a more useful tool in understanding cause of death.

#### **CONCLUSION**

Facilities of histopathological examinations of the autopsy tissues are available only in small number of institutions which often leads to delay and damages to the autopsy tissue samples. Also, factors like improper fixation and failure to send representative sections leads to contradiction between autopsy finding and histopathological examination. The histopathological examination helps in establishing the final cause of death. In addition to that it also provides additional information about prevalence of nosocomial infections in critical areas of hospital and prevalence of chronic infective diseases like tuberculosis.

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