

Pediatric autopsy - Does it yields valuable information?

M Pradeep Reddy¹, D Sridhar^{2*}, Nitin Sharma³, M S Bindra⁴, Anita Jassar Sen⁵

¹Department of Pediatrics} ²Community Medicine} ESIC Medical College, Sanathnagar, Hyderabad, Telangana, INDIA.

³Department of Paediatric Surgery, Pt JNM Medical College and Associated Dr. BRAM/DKS Hospital, Raipur, Chhattisgarh, INDIA.

⁴Department of Pathology, Command Hospital (Northern Command) and Military Hospital, Secunderabad, Andhra Pradesh, INDIA.

⁵Department of Pathology, Military Hospital, Bareilly, Uttar Pradesh, INDIA.

Email: dayyalasridhar@gmail.com

Abstract

Context: Although autopsy rates have declined significantly in recent decades, studies continue to validate the autopsy as an important source of clinically relevant information, a teaching tool, and a quality assurance measure. A recent review of autopsy series showed a decline in the number of serious errors likely to have affected clinical outcome detected at autopsy during the past 46 years, with a current major error rate of 8.4–24.4%. **Objective:** Our hypothesis was that the pediatric autopsy would uncover a significant number of major unexpected findings at the high end of the spectrum predicted by a recent review. This study assesses the unexpected findings at two military hospitals whose autopsy service handles in-house (tertiary care) cases for a vertically integrated health-care system. **Design:** Data were analyzed from an autopsy effectiveness report completed for all autopsies performed for 2003–2005. The data from this series include concordance of premortem and postmortem diagnoses, with the autopsy considered the criterion standard. The autopsy effectiveness report also provided logistic information such as problems with consents, medical records, and specimen identification. **Setting:** Pediatric autopsies were performed by members of the pediatrics and pathology division in a tertiary care hospital with a Level III neonatal intensive care and pediatric intensive care. The inpatient facilities consist of 432 total licensed inpatient beds including 46 licensed pediatric intensive care beds and 08 licensed neonatal intensive care unit beds. This hospital is part of a large health maintenance organization serving the surrounding entire northern command of Indian Army with all major subspecialty groups represented. **Patients:** A sample of all in-house and referral autopsies for 2003–2006 was examined. **Main Outcome Measure:** The percentage of cases with a major or minor diagnostic discrepancy or unexpected pathologic finding using the autopsy as the criterion standard. **Results:** A total of 1035 (493-2003, 425-2004, 117 up to April 30, 2005) deliveries took place between January 31, 2003, and April 30, 2005, of which 27 were reported as perinatal deaths (2003-09 and 03, 2004-08 and 01, March 31, 2005-03 and 03); 07 being stillborn and 20 being neonatal deaths. A total of 13 autopsies were performed; 09 were in the neonatal group and 04 were among the stillborn. The perinatal mortality rate for the hospital, not including medicolegal cases was 02%. Autopsies were done in 1% of all birth and 48% of perinatal mortality. The hospital autopsy rate for 2004 at 3.6%, the rate for 2003 declined to 1.4%, and the rate for the first half of 2005 was 2.16%. Of 13 autopsies, 01 (8%) revealed a major diagnostic discrepancy or unexpected pathologic finding, 07 (58%) had a minor unexpected finding or additional diagnosis, 8 (67%) clarified the differential diagnosis, 9 (75%) confirmed or verified a major diagnosis, and 03 (34%) provided information regarding treatment effects. In addition, 02 (20%) had problems with consent, all of which were resolved before initiation of the autopsy. **Conclusions:** These data confirm the value of the pediatric autopsy in a tertiary care hospital with a Level III neonatal intensive care. It is an important medical and quality assurance procedure for assessing the accuracy of diagnoses, clarifying differential diagnoses, yielding unexpected findings, and providing feedback regarding therapeutic outcomes.

Key Words: Autopsy, Discrepancy, Perinatal deaths, Stillbirths.

* Address for Correspondence:

Dr. D Sridhar, Community Medicine, ESIC Medical College, Sanathnagar, Hyderabad, Telangana, INDIA.

Email: dayyalasridhar@gmail.com

Received Date: 12/02/2018 Revised Date: 17/03/2018 Accepted Date: 10/04/2018

DOI: <https://doi.org/10.26611/1014611>

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 14 April 2018

INTRODUCTION

The autopsy will yield three observations. Understanding of the disease pathology completely, cross checks the accuracy of clinical diagnosis and provides feedback to clinician; above all it provides reliable data for epidemiologists. The first function has been one of the main sources of knowledge through which different diseases have been delineated and their development, complications, and relationships with other diseases understood¹. One goal of the autopsy is to determine cause of death; thus, it plays a clinically relevant role in evaluating and ultimately improving the quality of medical care and in medical education. Unfortunately, two significant trends have developed in recent years. The first is a major decline in overall autopsy rates during the past several decades. Adult autopsy rates around 50% were cited in 1950 but had dropped to 11.5% in 1992². Potential reasons include increased confidence in technologically advanced imaging studies and other premortem tests, fear of litigation, and misunderstandings by the family. Additional deterrents to autopsy in today's competitive health-care marketplace may include funding and perceptual concerns about the unfavorable outcomes³. In our experience and that of other institutions⁴⁻⁶, pediatric autopsy rates have also declined, although not as precipitously as adult rates. However, this is not a universal finding; perinatal autopsy rates vary greatly between institutions, and serial data from the same institution are rarely available⁷. An informal survey from 1995 showed rates from 25% to 53% excluding medical examiner cases and from 44% to 67% including medical examiner cases. The second trend is that despite a general trend toward declining autopsy rates, studies continue to show that the pediatric autopsy provides clinically relevant information and is a valuable teaching tool⁸. A better understanding of childhood mortality could contribute to a more effective approach to saving these lives. A country needs sound epidemiological information to prioritize, plan, and implement public health programs. There is a paucity of information about direct causes of

child mortality in developing countries. This information also provides the basis for patient care and helps the administration in managing day-to-day hospital affairs. The present study was aimed at finding the causes of mortality of inpatients in the pediatric department admitted during 2003–2005 and provides epidemiological information related to child mortality⁹.

MATERIALS AND METHODS

Objective: The objective of this study was to assess the unexpected findings at two military hospitals whose service handles in-house (tertiary care) cases for a vertically integrated health-care system.

Method: Data were analyzed from an autopsy effectiveness report completed for all autopsies performed for 2003–2005. The data from this series include concordance of premortem and postmortem diagnoses, with the autopsy considered the criterion standard. The autopsy effectiveness report also provided logistic information such as problems with consents, medical records, and specimen identification. Pediatric autopsies were performed by members of the pediatrics and pathology division in a tertiary care hospital with a Level III neonatal intensive care and pediatric intensive care. The inpatient facilities consist of 432 total licensed inpatient beds including 46 licensed pediatric intensive care beds and 08 licensed neonatal intensive care unit beds. This hospital is part of a large health maintenance organization serving the surrounding entire northern command of Indian Army with all major subspecialty groups represented. A sample of all in-house and referral autopsies for 2003–2006 was examined.

RESULTS

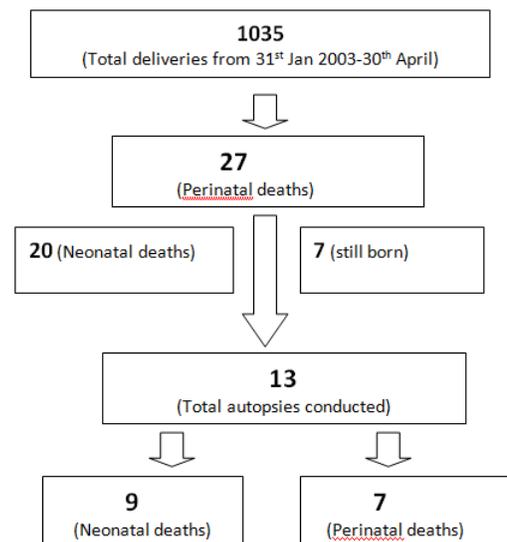


Figure 1: Algorithm of recruitment of cases

The perinatal mortality rate for the hospital, not including medicolegal cases was 02%. Autopsies were done in 1% of all birth and 48% of perinatal mortality. The hospital autopsy rate for 2004 at 3.6%, the rate for 2003 declined to 1.4%, and the rate for the first half of 2005 was 2.16% (Figure 2). Male-to-female ratio of autopsies was 1:1 (7 were male and 6 were female). Of 13 autopsies, 01 (8%) revealed a major diagnostic discrepancy or unexpected

pathologic finding, 07 (58%) had a minor unexpected finding or additional diagnosis, 8 (67%) clarified the differential diagnosis, 9 (75%) confirmed or verified a major diagnosis, and 03 (34%) provided information regarding treatment effects (Table 1). In addition, 02 (20%) had problems with consent, all of which were resolved before initiation of the autopsy.

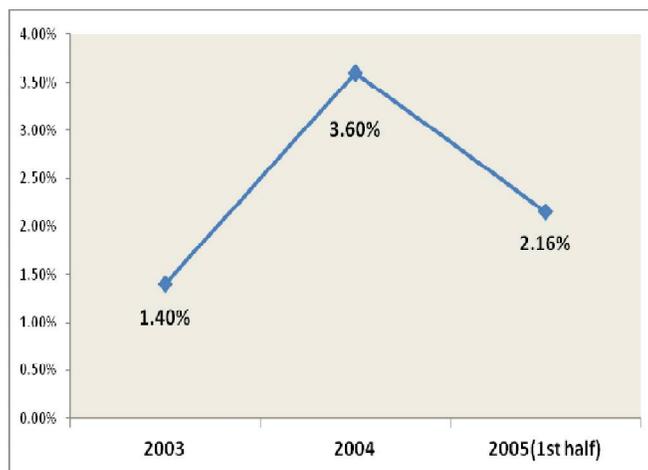


Figure 2: Year wise autopsy rate

Table 1: Discrepancies observed among cases

Discrepancy	Antermortem	postmortem
Major	Pulmonary haemorrhage Hydrops fetalis B/L spatnous pneumothorax Parinatal asphyxia	Ebstein's anomaly PDA (functional) with ostium secoundum ASD Gastric perforation Adrenal haemorrhage
Minor	Pulmonary haemorrhgia Pulmonary hypoplasia Meningitis gram – ve septicaemia Haemotympanum	Riedle's lobe Thoracic hyoplasia Secondary to E.coli Meningitis Neonatal Tetanus Neonatal Jaundice Alpha thalssemia Down's Syndrome Acute Myeloblastic leukemia M5 with DIC Prematurity DIC
No discrepancy		Multiple congenital malformations with hydrocephalous and ruptured lumbar meningo myelocele Respiratory distress syndrome (Hyaline membrane Disease)

DISCUSSION

Autopsy rate noted in this 2 years study was 3.6%. It was very low compared with the studies of Burton *et al.*¹⁰, Begum *et al.*¹¹ where they found lowest was 12%. This can be attributed to our minimal study period and consideration of only neonatal autopsies. Most of the times lack of knowledge and charged up emotions at the time of pediatric deaths hinder people to go for autopsy. The decline in the autopsy rate is said to be the result of the introduction of modern diagnostic methodologies.

However, overreliance on these methodologies contributed directly to the misdiagnosis of major underlying disease in 4.4% of the cases¹². Similar results have been reported by others¹³, with the exception of one analysis from Iceland¹⁴. Recently, Dhar *et al.*¹⁵ reported a total discordance rate of 58% in a Canadian study of 338 neonatal autopsies; as many as 18% of the cases had major discordances (Classes I and II). Earlier, Saller *et al.*¹⁶ reported that after autopsy, a diagnosis was changed or added in 34% of 47 neonatal deaths. Tasdelen *et al.*¹⁷

reported a total discordance rate of 55% between antemortem and postmortem findings in 301 neonates with autopsies. In 32.2%, major discrepancies were noted; in 23%, minor defects were diagnosed on autopsy. Meier *et al.*¹⁵ examined 172 perinatal deaths and found that autopsy helped to establish the cause of death in 26% of 139 perinatal cases and provided a cause of death in 31% of 87 neonatal and early infant deaths. These studies and our own observations demonstrate that neonatal autopsy continues to provide significant new information. Autopsies are generally regarded as an important measurement of the accuracy of clinical diagnoses¹⁸. Indeed, most autopsy studies published during this century, including the comparison of discrepancy rates in different medical eras, have shown considerable discrepancies (approximately 20%) between the main clinical and autopsy diagnoses, even though the clinicians were certain or fairly certain of their diagnoses^{13,14}. Despite these observations, the decline in the autopsy rates in Western societies is widespread. In Sweden, the autopsy rate (medicolegal autopsies excluded) fell to 18% in 1988. At Huddinge University Hospital, the rate fell from 80% to 39% over a 10-year period¹⁹. Misdiagnosed major diseases (approximately 25%; class 0) are comparable to those reported in the literature^{13,19}. As with the results of Landefeld *et al.*,¹⁴ the rates of unexpected findings were similar during the two periods at our hospital. Nevertheless, the rate of detection of unknown major underlying diseases was significantly higher in the later period. The increase is most probably the result of selection bias. This assumption is supported by both our hypothetical calculations and the observations of other investigators²⁰. However, a large number of cases with important unexpected findings were found at autopsy.

CONCLUSION

These data confirm the value of the pediatric autopsy in a tertiary care hospital with a level III neonatal intensive care. It is an important medical and quality assurance procedure for assessing the accuracy of diagnoses, clarifying differential diagnoses, yielding unexpected findings, and providing feedback regarding therapeutic outcomes.

REFERENCES

1. Birdi KS, Bunce DJ, Start RD, Cotton DW. Clinician beliefs underlying autopsy requests. *Postgrad Med J* 1996; 72:224-8.
2. Kumar P, Angst DB, Taxy J, Mangurten HH, Deangelis CD. Neonatal autopsies-A 10-year experience. *Arch Pediatr Adolesc Med* 2000; 154:38-42.

3. Gd L. College of American pathologists conference XXIX on restructuring autopsy practice for health care reform: Let's make this autopsy conference matter. *Arch Pathol Lab Med* 1996; 120:736-8.
4. Kumar P, Taxy J, Angst DB, Mangurten HH. Autopsies in children. Are they still useful? *Arch Pediatr Adolesc Med* 2013; 152:558-63.
5. Brodrie M, Laing IA, Keeling JW, McKenzie KJ. Ten years of neonatal autopsies in tertiary referral centre: Retrospective study. *BMJ* 2002; 324:761-3.
6. Landers S, MacPherson T. Prevalence of the neonatal neonatal autopsy: A report of the study group for complications of perinatal care. *Pediatr Pathol Lab Med* 1995; 15:539-45.
7. Khong TY. A review of perinatal autopsy rates worldwide, 1960s to 1990s. *Paediatr Perinat Epidemiol* 1996; 10:97-105.
8. Gordijn SJ, Erwich JJ, Khong TY. Value of the perinatal autopsy: Critique. *Pediatr Dev Pathol* 2002; 5:480-8.
9. Roy RN, Saswati N, Prabha S, Arindam C, Malay D, Kundu TK. Mortality pattern of hospitalized children in a tertiary care hospital of Kolkata. *Indian J Community Med* 2008; 33:187-9.
10. Shojania KG, Burton EC, McDonald KM, Goldman L. Changes in rates of autopsy-detected diagnostic errors over time: A systematic review. *JAMA* 2003; 289:2849-56.
11. Begum LN, Azad K, Akhter S, Nahar N. Assessment of perinatal mortality in a tertiary care hospital by using wigglesworth classification. *Bangladesh J Child Health* 2007; 31:32-9.
12. Gambino SR. The autopsy. The ultimate audit. *Arch Pathol Lab Med* 1984; 108:444-5.
13. Goldman L, Sayson R, Robbins S, Cohn LH, Bettmann M, Weisberg M, et al. The value of the autopsy in three medical eras. *N Engl J Med* 1983; 308:1000-5.
14. Landefeld CS, Chren MM, Myers A, Geller R, Robbins S, Goldman L, et al. Diagnostic yield of the autopsy in a university hospital and a community hospital. *N Engl J Med* 1988; 318:1249-54.
15. Dhar V, Perlman M, Vilela MI, Haque KN, Kirpalani H, Cutz E, et al. Autopsy in a neonatal intensive care unit: Utilization patterns and associations of clinicopathologic discordances. *J Pediatr* 1998; 132:75-9.
16. Saller DN Jr., Lesser KB, Harrel U, Rogers BB, Oyer CE. The clinical utility of the perinatal autopsy. *JAMA* 1995; 273:663-5.
17. Tasdelen E, Aksoy F, Arvas A. Causes of fetal and neonatal death. *Turk J Pediatr* 1995; 37:201-7.
18. Saracci R. Is necropsy a valid monitor of clinical diagnosis performance? *BMJ* 1991; 303:898-900.
19. Veress B, Alafuzoff I. A retrospective analysis of clinical diagnoses and autopsy findings in 3, 042 cases during two different time periods. *Hum Pathol* 1994; 25:140-5.
20. Cameron HM, McGoogan E, Watson H. Necropsy: A yardstick for clinical diagnosis. *BMJ* 1980; 281:985-8.

Source of Support: None Declared
Conflict of Interest: None Declared