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Spontaneous Pneumothorax in the Newborn: A Report of Two Fatalities

Pneumothorax in the newborn is a well-known complication of the respiratory distress syndrome and its therapy [1,2]. The sudden unexpected development of this condition in a full-term, apparently healthy infant is uncommon. When this pneumothorax leads to immediate death, the diagnosis will most likely elude clinicians and the case be reported to the medical examiner. The diagnosis can be readily made and documented if one is familiar with this entity and considers it prior to autopsy. The Southwestern Institute of Forensic Sciences has encountered two such deaths in a year.

Case 1

A 3600-g black female infant, rated 9/9 on the Apgar scale, was born to a 17-year-old, gravida 1, Para 0 woman. The delivery was uncomplicated and initial physical examination showed a normal, term infant. The child was observed for 6 h in the admitting nursery, during which time no abnormalities were noted. She was subsequently transferred to the well baby nursery for routine care. At 36 h of age she was found without spontaneous respiration or heart beat. Resuscitative efforts were unsuccessful.

A complete autopsy examination was performed at the medical examiner's office. X-ray (Fig. 1) revealed a left tension pneumothorax with a mediastinal shift to the right. This pneumothorax could not be demonstrated by opening the chest cavity under water. Aspiration of gastric contents was also present, but was insufficient to cause death, and was interpreted as agonal or resuscitative in origin. All other organs were completely normal and microscopic examination revealed nothing unusual.

Case 2

A 2860-g black female infant, rated 9/9 on the Apgar scale, was born to a 28-year-old gravida 3, Para 2 woman. The delivery was uncomplicated and the child was a normal, term infant. Three hours later she suddenly and unexpectedly had a cardiorespiratory arrest. She was resuscitated and transferred to the intensive care unit where X-rays revealed bilateral pneumothorax. Chest tubes were inserted and the infant lived approximately 17 to 18 h on a respirator with 100% oxygen.

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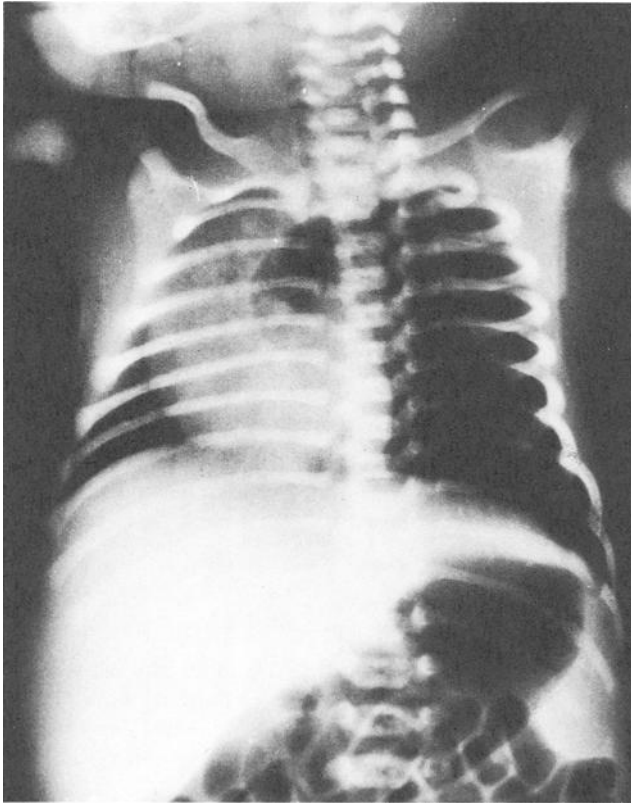


FIG. 1—*Postmortem X-ray demonstrating left pneumothorax in Case 1.*

A complete autopsy was performed at the medical examiner's office. Chest tubes were properly placed and there was atelectasis of both lungs. Scaip hemorrhage and very small frontal subdural hematomas secondary to delivery were noted. The remainder of the examination was unremarkable. Microscopically a very early pleuritis was present along with fairly extensive intraalveolar hemorrhage. There was no other abnormality.

Discussion

Spontaneous pneumothorax in the full-term, apparently healthy newborn is uncommon. The reported incidence varies with the type of study done. Two prospective studies, done in the 1930s, utilizing chest X-rays found incidences of 1 to 2% of live births [3,4]. This figure is widely quoted in pediatric texts. Howie and Weed [5] in the late 1950s reviewed the subject and thought that the incidence was much lower, citing unsatisfactory X-ray techniques as the culprit. However, a recent study by Steele et al [6] in which newborn infants were routinely X-rayed revealed an incidence (1.3%) comparable to the earlier studies.

The fact that pneumothorax is present on X-ray does not necessarily indicate that the child is symptomatic nor that there are any signs of this condition. This phenomenon is shown by the fact that two studies using only observation and physical examination report incidences of 0.05 and 0.07% [7,8]. Virtually all term infants with spontaneous pneu-

mothorax have resolution without sequelae and in fact without the condition ever being diagnosed.

The study by Steele et al [6] points out some other interesting aspects of pneumothorax of the newborn. The presence of this condition in premature infants is less than that in full-term, vaginally delivered infants (1% versus 1.3%). It has been postulated that this difference is due to the greater transthoracic pressure generated by the term infant during the first hours of life when normal respiration is being established. A predisposing factor to the development of spontaneous pneumothorax is meconium staining of amniotic fluid. The postulated mechanism is believed to be partial blockage of airways as a result of the in-utero respiratory efforts of the distressed infant. This blockage then creates a greater likelihood of increased pressure with respiration.

Emery [9], in a study of 100 consecutive hospital autopsies on infants, reported 13% of deaths in full-term infants resulted from pulmonary interstitial emphysema, usually associated with pneumothorax, pneumomediastinum, or both. The two cases reported herein represent a fairly high percentage of the newborns autopsied at this office since death resulting from obvious congenital anomalies and neonatal sepsis are either not reported or not accepted. In both cases the infants were completely normal prior to cardiorespiratory arrest. In one case the diagnosis was established prior to death and in the other it was not suspected and may well have been missed had not a chest X-ray been performed prior to autopsy.

Summary

Spontaneous pneumothorax is present in 1 to 2% of healthy full-term newborn infants. Virtually all cases have resolution of the pneumothorax without sequelae and in fact without the condition being diagnosed. Two fatal cases are presented. Anyone doing medicolegal autopsies should be aware of this entity so that X-rays or other appropriate methods to demonstrate it can be used.

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