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## "Pneumoscalp" after Pneumomediastinum in a Neonate

Harbhajan Singh Chawla<sup>1</sup> and Howard J. Naidech<sup>2</sup>

### Case Report

Twin B, weighing 1200 g, was born at 30 weeks gestation to a 17-year-old gravida 2, para 0 mother. Apgar scores were 7 at 1 min and 8 at 5 min. Apnea and bradycardia were treated by endotracheal intubation. Hyaline membrane disease was present clinically and radiographically. Right pneumothorax present on day 1 and left pneumothorax on day 2 were treated by bilateral chest tube placement.

A necrotic part of ileum was resected on day 7, and the whole bowel appeared pregangrenous at laparotomy. On day 10, crepitus was noted in the neck and over the scalp, but not over the parotid gland or mastoid process. Chest radiography revealed pulmonary interstitial emphysema, pneumomediastinum, and air in the neck with the sternocleidomastoid muscles defined by the surrounding air (fig.

1A). Skull films revealed extensive accumulation of air under the scalp with significant separation from the outer table at the vertex and laterally (figs. 1B and 1C).

The resultant tautness and disfigurement led to treatment with a catheter inserted under the scalp attached to constant underwater seal drainage. On day 12, the air leak ceased, and on day 14, crepitus was not present in any site. The peak inspiratory pressure was 25 cm water when the accumulation of air was present under the scalp. The infant was discharged at 3 months of age and at 6 months showed no disfigurement.

### Discussion

Pneumomediastinum is a well known complication of assisted ventilation for hyaline membrane disease. Air can reach

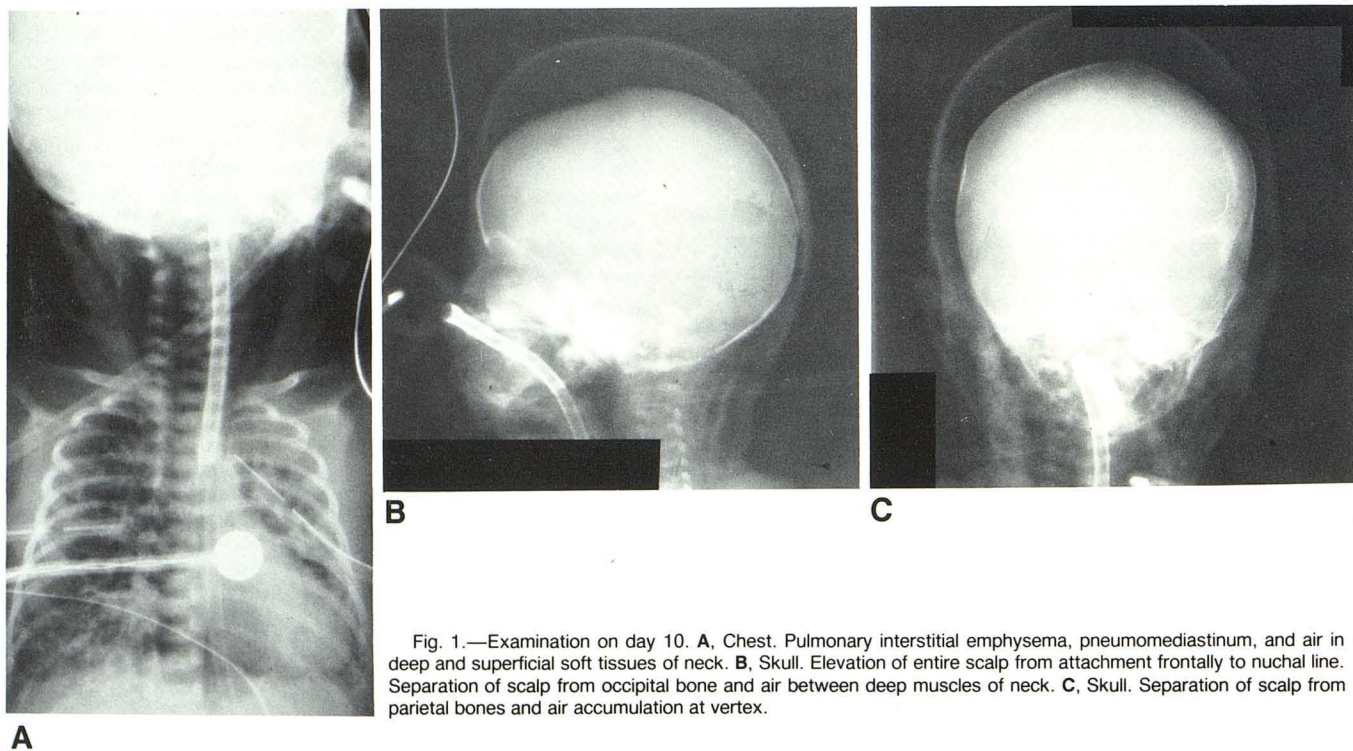


Fig. 1.—Examination on day 10. **A**, Chest. Pulmonary interstitial emphysema, pneumomediastinum, and air in deep and superficial soft tissues of neck. **B**, Skull. Elevation of entire scalp from attachment frontally to nuchal line. Separation of scalp from occipital bone and air between deep muscles of neck. **C**, Skull. Separation of scalp from parietal bones and air accumulation at vertex.

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the neck by dissecting along the carotid sheath and may also extend to the upper arm [1]. A review of the literature failed to indicate that air may extend superiorly to separate the scalp from the outer table of the skull. "Pneumoscalp" seems to be an appropriate term for this uncommon observation.

Anatomically, the carotid sheath is connected to neighboring layers of loose areolar tissue of the deep cervical fascia. Enclosed within the deep cervical fascia are the muscles, viscera, and major vessels of the neck. Posteriorly, the superficial lamina of this deep fascia is fused with the periosteum of the occipital bone along the superior nuchal line. Anteriorly, the fascia is fused to the entire inferior aspect of the mandible and extends to the mastoid ensheathing the parotid glands [2].

The galea aponeurotica covers the outer table of the skull and joins the epicranium, a continuous fibromuscular sheath from the nuchal line to the eyebrows. The galea aponeurotica attaches to the occipital bone at the superior nuchal line. The auricular muscles are attached to the galea laterally as it continues over the temporal fascia to attach to the zygomatic arches [2].

We postulate air reached the deep cervical fascia from the carotid sheath, extending between muscles of the neck (fig. 1). Air could then reach the scalp where the galea aponeurotica and deep cervical fascia are attached at the nuchal line, mastoid process, and parotid glands. Since air was not observed around the parotid gland and mastoid process, presumably it entered the scalp at the nuchal line through a potential weak point at this attachment. The lateral radiograph supports this idea, showing the thin skin of the neck has been elevated by air with no breakage of continuity of air at the superior nuchal line. The scale is seen in its entirety from its attachment to the frontal bone to where it is elevated from the occipital bone. This continuity allowed us to decompress the pneumoscalp by a single drainage catheter.

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