Accidental Intravascular Placement of a Feeding Tube

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MALPOSITIONING of nasoenteric feeding tubes frequently is described in the medical literature and includes the tracheobronchial tree, the interpleural space,1 perforation of the esophagus and pneumothorax,2 and the ensuing complications, such as mediastinitis, pneumonia, and empyema.3 In addition, intracerebral placement via the intact, as well as the traumatically altered, base of the skull have been reported.3,5 We report the intravascular malpositioning of a nasogastric tube. This case report shows that an acute and potentially life-threatening situation may arise after uneventful passage of such a tube.

Case Report

The patient was a 56-yr-old woman after an emergency multiple coronary bypass graft procedure. She was exubated on day 4 after surgery but had several episodes of vomiting. Because of this and because enteral feeding was to be commenced, a nasogastric tube was necessary. The nasogastric tube that had been uneventfully placed at the time of surgery had been removed accidentally.

A lubricant containing a local anesthetic was therefore instilled into the right nasal cavity. An unrefrigerated 14-French polyurethane tube without a guidewire (Sherwood, Tullamore, Ireland) was easily passed downward via the right nostril after a slight initial resistance. A 50-ml syringe was then attached to the tube, and aspiration was attempted. Immediately, the syringe filled with dark red blood. Because a major gastrointestinal hemorrhage was assumed, a rapid-sequence intubation was performed to secure the airway. Eventually, 2.1 l of blood was drained through the tube during moderate suctioning. By this time, the patient became hypotensive; therefore, suctioning was discontinued. The hemodynamic situation was restored by the rapid infusion of 2000 ml hydroxyethyl starch solution (6%), 7 U packed erythrocytes, and 3 U fresh frozen plasma.

Fibroptic esophagogastrosCOPY neither revealed the source of bleeding nor the location of the nasogastric tube in the upper gastrointestinal tract. Further testing for the location of the tube included plane chest radiography with and without contrast, thoracic echocardiography, and computed tomography. The tests revealed that the nasogastric tube had penetrated the right internal jugular vein at the height of the soft palate and passed down the superior vena cava into the right atrium. (Figs. 1 and 2)

The nasogastric tube was removed, and the site of entry was compressed with a nasopharyngeal tamponade. This tamponade could

Fig. 1. Chest radiograph. The contrast-filled nasogastric tube runs paravertebrally on the right side and ends in the right atrium. The path is parallel to that of the central venous line. Note that no pooling of contrast medium can be identified at the tip of the nasogastric tube, suggesting an intracardial placement.

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Fig. 2. Axial computer tomography scan at the height of the thyroid cartilage. The black arrow marks the nasogastric tube, which joins the central venous line in the internal jugular vein. The white arrow marks a nasogastric tube correctly placed in the esophagus at a later time.

be removed the next day without any sign of bleeding. To prevent infection, imipenem/cilastin was administered intravenously for 6 days. Nine days after the incident, the patient was transferred back to the referring hospital without any sign of infection or other untoward sequelae.

Discussion

Although reports exist describing nasogastric tubes that have eroded into major vessels, to our knowledge, this is the first report of the inadvertent, direct vascular placement of a nasogastric tube. When blood returned via the tube, our first assumption was that a major gastrointestinal tract hemorrhage had occurred. Only after hypotension resulted from our continued nasogastric suctioning did we consider an alternative diagnosis, and only after radiologic studies were completed was the actual location of the tube ascertained.

Anatomic variants of the nasopharynx facilitate malpositioning of nasogastric tubes.7 Our patient had a deviation of the nasal septum to the left. The tube followed the concave contour of the septum, deviating to the right, and ultimately perforating the lateral oropharyngeal wall.

Various forms of perforation of the esophagus with a nasogastric tube have been described.8 Passage of soft nasogastric tubes often is facilitated by the use of reinforcing wire guides or by increasing the stiffness of the tube through previous refrigeration.9 Because our patient was awake and cooperative, she could assist in the placement by swallowing, making the use of any of these adjuncts unnecessary. No undue force was applied during the placement of the tube.

Various ways to verify correct placement of nasogastric tubes have been described.10,11 The most common method is insufflation of air and auscultation for gurgling sounds over the upper left quadrant of the abdomen. This method does not allow reliable differentiation between gastric and endobronchial placement.12 In this case, insufflation of air before aspiration most likely would have led to a lethal outcome. Therefore, we believe that aspiration through the nasogastric tube should always be attempted before the injection of air.

If correct placement of the nasogastric tube cannot be confirmed by clinical means, radiologic verification is needed.13,14 This may occasionally be the only way to define the anatomic route and the exact location of the tip of the nasogastric tube.

References

Anesthesia for Cesarean Section in a Pituitary Dwarf

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Providing anesthesia for parturient patients with dwarfism is an uncommon problem faced by anesthesiologists. We describe the anesthetic management for cesarean section in a patient with pituitary dwarfism.

Case Report

A 29-yr-old healthy primiparous woman (height, 124.75 cm [4 ft, 1 in]) was seen at 36 weeks' gestation for anesthetic consultation before elective cesarean section. Her parents were of normal stature, and her other siblings were taller than 5 ft. At physical examination, she was short but normally proportioned. Her height was in the fiftieth percentile for a 7-yr-old girl, and her weight was 35.2 kg (pregnancy weight, 27.2 kg). Mouth opening, dentition, and tongue size were proportionately normal with a Mallampati class II airway. Neck flexion and extension were normal. Her spine was proportionately short with normal curvatures and had easily palpable lumbar interspaces. Laboratory studies revealed an abnormally low level of growth hormone, but all other endocrinologic studies and blood glucose levels were normal. Ultrasoundography performed at 36 weeks revealed a normally proportioned fetus with an estimated fetal weight of 2,932 g. Continuous lumbar epidural anesthesia was planned for cesarean delivery at 39 weeks' gestation. Just before surgery, 1 l lactated Ringer's solution was administered.

Discussion

This is the first report describing the anesthetic management for cesarean section in a woman with pituitary dwarfism. Dwarfism is defined as the failure to achieve a height of 4 ft 10 in (148 cm) at maturity. Dwarfism affects 20,000 - 100,000 people in the United States, and more than 100 types of dwarfism exist. People with pituitary dwarfism, who have a human growth hormone (hGH) deficiency, appear child-like even as adults, with normally proportioned limbs and trunk. During pregnancy, the uterus becomes an intraabdominal organ early in gestation, and fetal growth may lead to encroachment on the diaphragm as early as 28 weeks' gestation. Tyson reported a pregnant woman with pituitary dwarfism who, at 30 weeks gestation, had tachypnea and decreased vital capacity, which progressed to oxygen desaturation and respiratory acidosis at 35 weeks' gestation, necessitating cesarean delivery. The pelvic diameters of persons with pituitary dwarfism usually are only adequate for delivery of a preterm infant. Berkowitz recently described the anesthetic consid-

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