Corynebacterium Diphtheriae in a Patient with Multiple Trauma*

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A 46-year-old patient was admitted to hospital with a flail chest and multiple trauma. Tracheostomy was performed and mechanical ventilation commenced. Corynebacteriaceae diphtheriae were cultured from the tracheal aspirate. The patient remained asymptomatic. The monitoring and interpretation of tracheal aspirate cultures in intubated patients is stressed.

Colonization of the tracheobronchial tree with Gram-negative organisms following prolonged nasotracheal intubation or tracheostomy frequently is found in current hospital populations.1,2 These changes in tracheal flora relate either to the period postintubation or to prophylactic or therapeutic use of antibiotic drugs. Gram-positive organisms usually are found early in the course of hospitalization and probably represent contamination of the lower airway as a result of the introduction of the organisms during intubation. The presence of organisms, per se, cultured from the tracheobronchial tree does not constitute a pulmonary infection without evidence of fever, leukocytosis, and changes in the chest roentgenogram. Where specific pulmonary infection is not present, antibiotics directed at organisms found in the tracheal aspirate, particularly Gram-negative organisms, are contraindicated because of the development of superinfection. Nevertheless, the results of the cultures of routine frequent tracheal aspirates are of considerable benefit. They provide evidence of the presence of Gram-positive organisms, eg, beta hemolytic streptococci, which may require immediate antibiotic therapy. They also permit detection of changes in the tracheal flora, and thereby allow rapid utilization of antibiotic therapy if and when pulmonary infection becomes overt.

This case illustrates the need for monitoring the bacteriology of tracheal aspirates.

CASE REPORT

A 46-year-old woman was admitted to hospital following a motor vehicle accident. She was found to have multiple bruises and lacerations, a gross flail chest and a ruptured spleen. The remainder of the clinical examination was normal. The chest roentgenogram showed multiple fractures of the third through the tenth left ribs with minimal pulmonary contusion. The trachea was intubated and the patient anesthetized. Closed tube thoracotomy (left), splenectomy and tracheostomy were performed, and the patient was transferred to the intensive care unit. Mechanical ventilation was maintained with an Emerson postoperative ventilator at a tidal volume of 900 ml (patient weight, 60 kg) and a respiratory frequency of 12 per minute. After one hour, arterial blood gases at an FiO₂=1.0 were: PaO₂ 527 torr, PaCO₂ 15 torr, pH 7.61, AaDO₂ 158 torr, physiologic dead space per tidal volume ratio 0.49, base deficit 2.0 mEq/L, Qs/Qt 8 percent, A-Vo₂ 6 vol percent. Mechanical dead space was introduced into the ventilator circuit and the FiO₂ reduced. The patient was subsequently maintained at an FiO₂=0.40 and a PaCO₂ 35 torr.

Tracheal aspirate at the time of tracheostomy revealed normal flora. On the second hospital day, the cultured tracheal aspirate showed a heavy growth of Corynebacterium diphtheriae. On clinical examination, there was no membrane present in the trachea, the nose, the pharynx, or any wounds. The in vitro toxin test confirmed that this was a toxicogenic organism. Clindamycin (Cleosin) 150 mg po every six hours was commenced and continued for seven days; 80,000 units of antitoxin were given intravenously. Routine tracheal aspirates were cultured daily. The intensive care unit staff and all hospital personnel who had been in contact with the case had throat swabs cultured specifically for C diphtheriae.

Examination of the hospital files showed that the patient's ten-year-old son had been an in-patient 15 months previously, with a diagnosis of clinical diphtheria.9 He had been discharged with negative cultures. No evidence of C diphtheriae was found in any hospital contact. C diphtheriae was no longer present in the patient's tracheal aspirate 72 hours after therapy was instituted. The patient made an uneventful recovery, was subsequently weaned from the ventilator, and discharged to her home.

DISCUSSION

This is the first documented case of a patient with a flail chest injury and with C diphtheriae in the tracheobronchial tree. In the absence of clinical disease, it can be assumed that this patient was a carrier of the organism, presumably in the nasopharynx. Had routine procedures not been adhered to, C diphtheriae could have spread unsuspectedly in the many patients with tracheostomies in the intensive care unit. This case illustrates the need for, and the value of, initial and then frequent tracheal aspirate cultures in all patients with endotracheal and tracheostomy tubes.

REFERENCES

