INCIDENCE OF SINUSITIS IN PATIENTS WITH NASOTRACHEAL INTUBATION

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Nasotracheal intubation (NTI) is a procedure frequently used in connection with mechanical ventilation. Sinusitis is one of the complications that may arise after intubation. The incidence has been described as ranging up to 26% [1]. Grindlinger and colleagues [2] studied 111 neurosurgical patients. NTI had been performed in 31 and 16 of these developed sinusitis. However, it has been our impression that the incidence is higher than previously stated and, consequently, we have undertaken a prospective study of the incidence of sinusitis following NTI.

METHODS AND RESULTS

The incidence of radiological sinusitis was examined in consecutive patients with cerebral haemorrhage or cranial trauma in whom computerized tomographic scanning (CT-scanning) and NTI had been performed, and who were treated with subsequent mechanical ventilation. It was not possible to obtain informed consent because the patients were unconscious on admission, but the design was approved by the local Ethics Committee.

CT-scans showing thickening of the mucosa without air/fluid levels were considered to be negative. Radiological changes such as air/fluid levels or opacification of the paranasal sinuses were considered positive findings (fig. 1). Assessment of the scans was undertaken by two radiologists, one participating in the study (MP), and controlled by a radiologist otherwise not participating in the study.

The first CT-scan was made either before NTI or immediately after. Patients with positive findings at the first scanning, or patients who were transferred to another hospital before rescanning, were excluded. The remaining patients were rescanned after 1, 2 and 3 days following the intubations, which were performed as emergency procedures.

If there was discharge of pus from the nostril involved, samples were obtained for bacteriological examination.

Of 41 patients in whom CT-scanning and intubation were performed because of cranial trauma or cerebral haemorrhage, 29 were excluded because they had signs of sinusitis at the first scanning or because they were transported to a neurosurgical department for operation before rescanning. Of the 12 remaining patients in the study (median age 39.9 yr, range 4–77), six suffered cerebral haemorrhage and six cranial

SUMMARY

Sinusitis is a complication known to accompany nasotracheal intubation, but its frequency has not been well documented. Twelve patients suffering from cerebral haemorrhage or from cranial trauma and treated with mechanical ventilation were examined for radiological and bacteriological signs of sinusitis with CT-scanning, and cultures of nasal pus discharge. All patients showed radiological signs of sinusitis within 3 days after intubation. They all developed fever, six with a known focus outside the sinuses. There was an even distribution of Gram-negative and Gram-positive bacteria. It is concluded that sinusitis should be considered where fever occurs without known focus in patients with nasotracheal intubation.
Fig. 1. CT-Scanning 24 h after nasotracheal intubation showing air/fluid level in the right maxillary sinus.

trauma. All showed signs of sinusitis at control scanning 1 or 2 days after intubation. In seven patients, the maxillary sinus on the same side as the NTI was affected primarily. Nine patients developed polysinusitis. In one patient the pattern was atypical, since he first developed opacification of the sinus opposite the intubation, but a nasogastric tube (NTG) was situated on the side of the sinusitis. Nasogastric tubes were inserted in seven patients.

All patients developed fever (temperature > 38.5 °C), six with a known focus of infection outside the sinuses. None of these developed sepsis during the period of investigation. Most of the patients had mildly increased white blood cell counts. Positive cultures of nasal pus discharge were found in seven patients. The cultures consisted mostly of a single predominant species, and with an even distribution of Gram-negative and Gram-positive bacteria.

**COMMENT**

Sinusitis in connection with NTI is caused by direct irritation followed by oedema and blocking of the ducts in addition to direct obstruction caused by the tube. In this study, we found that all patients showed radiological signs of sinusitis after intubation of 72 h duration.

Seven of the patients also showed clinical signs as discharge of pus around the nasotracheal tube. This incidence is much higher than previously observed. An explanation of this high incidence may be that our patients were exposed to several predisposing factors such as NTG, heavy sedation, supine positioning, immobilization and possibly emergency NTI [2, 3].

The fact that we used CT-scans in all patients may also explain the high incidence. In addition to providing a high diagnostic level of identification (> 90%), CT-scanning makes it possible to evaluate the frontal, sphenoid and ethmoid sinuses. The diagnosis of sinusitis may be made by ordinary x-ray examination using four standard projections. This provides positive identification in 25% of patients. If Water’s view is added, identification increases to approximately 90% [1].

The development of sinusitis seems to be a dynamic process since, in most patients, the air/fluid level or opacification was found first on the side where the tube was positioned, and subsequent scannings showed reactions in the other sinuses.

The aim of treatment is primarily to improve the size of the nasal passage (removal of the tube, oral intubation or tracheotomy). These measures seem curative within 48 h in most patients [4]. Topical treatment with decongestants may be temporarily useful. Further treatment comprises administration of antibiotics. Surgical drainage should be considered only in patients in whom conservative treatment is unsuccessful.

It is suggested that the diagnosis of sinusitis should be considered when fever is present without a known cause in patients with nasotracheal intubation.

**REFERENCES**


