## H19 The Anesthesiologist's Responsibility in Intracranial Placement of the Nasogastric Tube (NGT): A Case Series and Literature Review

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**Learning Overview:** The goal of this presentation is to share the dangers of NGT misplacement and penetrating the cranial cavity as the consequence of a perforated ethmoid-sphenoid floor. Medical past history and patient records need to be analyzed before any clinical decision, even in an emergency setting, and correct positioning of the NGT ascertained with X-ray or a dedicated pH indicator paper.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by informing attendees of the risks of an apparently simple and uneventful medical procedure, which nevertheless could cause serious, sometimes fatal, complications.

This presentation aims to share with forensic science community the risk and consequences of NGT misplacement, including perforation of the ethmoid-sphenoid floor with subsequent penetration of the cranial cavity. NGTs have a key role in the management of hospitalized patients, especially critically ill ones. Numerous cases of inadvertent penetration of the intracranial compartment by an NGT in the setting of skull-based trauma and/or surgery have been reported. Blind endonasal procedures are particularly at risk of being associated with severe complications. Inadvertent insertion of NGTs into the cranial cavity has also been reported in non-traumatic settings, especially when certain congenital or acquired anatomic anomalies are present. Marked nasal septal deviation, underdevelopment of nasal turbinates, and high-grade pneumatization of the paranasal sinuses are examples of anomalies that may predispose to incorrect positioning of a NGT.

The first illustrative case presented here is that of a psychiatric patient with a history significant for the occasional use of hashish and other drugs and an unknown lesion of the ethmoid sinus. One morning, he was found unconscious in the bathroom of the hospital. Due to suspicions of drug use and a positive response to opioid antagonist administration, an NGT was placed. The second case is that of a patient with intracranial bleeding following pituitary macroadenoma transphenoidal surgery. During emergent decompressive craniotomy, the anesthetist placed an NGT. Retrospective analysis of two such cases provides an important opportunity to assess the effect of a malpositioned NGT from a medicolegal point of view, educate regarding evidence-based methods for device insertion, and overall reduce risks.

Before any invasive procedure (even if emergent), it is advisable to take time to review patient history and medical records. Most importantly, the clinical situation should be carefully assessed for factors such as impaired consciousness, anatomical facial abnormality, and head-facial injury. The second evaluation that must always be carried out is to determine whether nasogastric feeding is appropriate for the patient, and the rationale for any decision must be recorded in the patient's medical notes. To prevent malpositioning of an NGT, a radiological control must be performed; if this is not available, pH indicator paper should be used to test for human gastric aspirates. If there is insufficient support to confirm NGT placement, placement should be delayed until that support is available (unless clinically urgent.) These procedures are useful in order to avoid subsequent damage to anatomic structures; however, they are futile if intracranial insertion of the tube has already caused brain injury.

In the first presented case, the patient survived the malpositioned NGT without neurological sequelae, while in the second case the patient died due to intracranial hypertension. From a medicolegal point of view, the anesthetist's decision to place an NGT in the first case was not deemed wrong due to the suspected drug use; the public prosecutor thus acquitted the anesthetist of criminal negligence. In the second case, however, the decision to insert an NGT was deemed incorrect due to the previous known surgical procedure; the public prosecutor thus convicted the anesthetist of incompetence and imprudence. In conclusion, though typically uneventful, NGT positioning can rarely be complicated by misplacement. Past medical history and patient records should be reviewed before making the clinical decision to insert an NGT—even in an emergent setting. Correct NGT positioning can be ascertained via X-ray or dedicated pH indicator paper.

**Nasogastric Tube, Intracranial Placement, Anesthesiologists' Responsibility**



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