Tracheostomy in the intensive care patient: surgical or percutaneous?

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Tracheostomy is one of the oldest surgical procedures: Egyptian illustrations of the technique date back to 3600 BC, and the Talmul (3rd century AD) describes the use of a reed pipe to stent the trachea of a suffocating goat (Sercer, 1962).

Indications today may be summarized as:

1. To maintain airway access in patients requiring prolonged mechanical ventilation or weaning
2. To facilitate removal of retained secretions from the tracheobronchial tree
3. To prevent or bypass airway obstruction above the larynx.

While it may substantially assist management, tracheostomy performed by whatever route may lead to significant and serious complications, including haemorrhage, pneumothorax or pneumomediastinum and tube misplacement, which may itself precipitate devastating haemorrhage, in addition to loss of the airway. Tracheal stenosis is an important late complication.

The modern technique of formal surgical tracheostomy was described by Chevalier Jackson in 1909. Reports of percutaneous techniques emerged more recently, culminating in the description of serial dilatation using a Seldinger technique by Ciaglia et al in 1985. A percutaneous tracheostomy is one performed without naked eye visualization of the trachea, using minimal dissection, through the smallest incision possible. Its perceived advantages in the intensive care setting are the relative ease and speed of its performance, avoidance of the risks associated with transfer of critically ill patients to the operating theatre, together with potential cost savings.

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Several controlled trials suggest that bedside percutaneous tracheostomy is safe and cost effective, with complications that compare at least favourably with those of open tracheostomy. By contrast, a meta-analysis incorporating studies between 1960 and 1996 concluded that percutaneous tracheostomy was associated with more perioperative complications (including cardiorespiratory arrest and death) and lower postoperative complication rates (e.g. tracheal stenosis) (Dulgerov et al, 1999). 'Percutaneous' may be taken literally, or may involve blunt dissection to a degree not far short of an open procedure, potentially with loss of the benefits of either approach.

While some would consider certain anatomical or clinical parameters to be relative contraindications to a percutaneous technique (e.g. short neck, high positive end expiratory pressure requirement, coagulopathy), Hill et al (1996) suggested that a percutaneous technique is applicable in these cases.

It is beyond doubt that a considerable and increasing number of intensive therapy unit (ITU) tracheostomies are being performed safely and percutaneously at the bedside. The question of what impact this change imparts with respect to training issues has been raised (Simpson et al, 1999) — will the general surgical trainee miss a valuable training opportunity? At the same time, if complications do ensue, is it not easier for a surgeon to 'get out of trouble' in an operating theatre with an adequate field of access?

What is certain is that it is not possible to draw conclusions nor to suggest guidelines with which every authority will agree. Percutaneous tracheostomy at the bedside surely has an established place in ITU practice if there is appropriate selection of both patient and practitioner. Careful supervision of inexperienced operators is required, but this applies both to open and percutaneous techniques. It is a paradox that an uncomplicated percutaneous tracheostomy may be preferable to an uncomplicated open procedure, yet, if complications do arise, one would prefer for them to occur in the open setting of an operating theatre. Exclusion of patients with obvious predictors of potential difficulty, together with careful supervision, helps favour the percutaneous route, and most authors would consider bronchoscopic surveillance to be invaluable if not essential.

Perhaps the decision rests most sensibly on local considerations; neither technique is wrong and either technique may go wrong. Individual and local preferences, experience and expertise will help to facilitate the decision-making process. HM

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