Oral feed for patients with a tracheostomy: Balancing risks and benefits 2C04, 3C00

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Many patients on the intensive care unit have tracheostomies sited, following which some clinicians advocate that they should be fed via a nasogastric tube, as taking food orally might present a risk of aspiration. However, nasogastric (NG) tubes also have associated risks, harms and costs. The Royal Bolton Hospital is a district general hospital in the UK with an 8-bedded, mixed medical/surgical intensive care unit admitting around 430 level 3 patients per year. We describe our clinical practice in terms of a liberal attitude to offering oral feed to a selected group of patients with tracheostomies *in situ*. We postulate that this approach has several advantages and that the balance between risk and benefit must be assessed in each individual case. Expert assessment by Speech and Language therapists can help these judgements. Some beliefs regarding aspiration risk in patients with tracheostomies lack supporting evidence.

Keywords: *tracheostomy; intensive care; enteral nutrition; pneumonia, aspiration; safety.*

Background

Tracheostomies are often performed on the intensive care unit (ICU) with a common indication to facilitate weaning from mechanical ventilation. More than 12,000 tracheostomies are estimated to be performed per year in the UK, with approximately two-thirds of these for patients on ICUs.[1] Sedation requirements are decreased with a tracheostomy *in situ* versus an oral endotracheal tube. With reduced sedation, patients become more autonomous and begin to make the transition towards self-care; complete autonomy and discharge home is one of the ultimate goals of treatment. Although there is no definitive trial evidence that siting a tracheostomy tube improves outcome from critical illness, the large numbers performed strongly suggest that many practitioners consider them a useful intervention for at least some patient groups.

Tracheostomy and aspiration

There is concern that the presence of a tracheostomy tube interferes with normal mechanisms of swallowing, so food taken orally risks aspiration.[2] However, despite the fact that swallowing mechanisms are theoretically affected by the presence of a tracheostomy tube cuff, the clinical significance of this is unknown. Some national guidelines appear to insist that the presence of a tracheostomy with an inflated cuff precludes safe swallowing,[3] but the studies cited supporting this statement consist of two observational studies with conclusions that are contradictory. One study was an assessment of swallow before and after tracheostomy insertion in 20 patients and showed no causal relationship between tracheostomy and aspiration;[4] the other was a comparative assessment of aspiration with a tracheostomy *in situ* and after removal in 37 patients, again concluding no difference attributable to the presence of the tracheostomy tube.[5] The absence of a causal relationship between tracheostomy tube and risk of aspiration has been confirmed in other, similar studies.[6,7] It has also been shown that two-thirds of patients with a new tracheostomy can swallow safely, although increasing age may be inversely related to success.[8]

Although the presence or absence of a tracheostomy tube does not necessarily determine aspiration risk, aspiration does appear to be common in intensive care patients. One published series of 553 patients showed 69% were aspirating based on fibreoptic evaluation.[9] Perhaps surprisingly, aspiration is also reported to occur in 45% of normal people during sleep,[10] and so it is not enough to determine whether aspiration occurs, but to judge whether it is clinically significant. Despite this fact, it is hard for clinicians to resist the instinct that any aspiration is a major risk to the patient and thus instruct alternatives to oral nutrition, with the implication (either conscious or otherwise) that this choice results in net benefit; however, these instincts are not always confirmed by trials. One randomised trial of 70 patients after extubation compared management based on formal endoscopic swallow assessment with standard clinical care and showed no difference in subsequent aspirations or outcome.[11] Although using fibreoptic assessment of swallow as a routine for tracheostomy patients shows that aspiration is relatively common and that clinical assessment alone results in under-diagnosis,[12] the hypothesis that subsequent management based on such assessments has a positive effect on meaningful clinical outcomes seems unproven. Informal communication with other hospitals and units tells us that practice varies quite widely regarding the best way to provide nutrition to patients with a tracheostomy.

Nutrition and nasogastric tubes

Critically ill patients in ICU are at risk of malnutrition and

Type	Complication
Misplacement	Upper airway, mid-oesophagus, intracranial, bronchial (including pneumothorax)
Trauma	At insertion (nose, upper airway); medium term (fistulae, pressure sores)
Displacement	Bronchial administration of feed/drugs
Reflux	Impaired function of gastro-oesophageal sphincter (may increase aspiration risk)
GI intolerance	Nausea, bloating
Infection	Sinusitis
Psychological	Lack of oral intake, exacerbates agitated delirium

Table 1 Some complications of nasogastric tubes.

adequate nutritional intake is an important goal. It is estimated that only about half of all critically ill patients get their recommended daily calorific requirements.[13] Delayed initiation of enteral nutrition, slow advancement of feed infusion rates, under-prescription of feed, incomplete delivery of prescribed nutrition and frequent interruption to enteral nutrition all contribute to this problem. Feeding interruption can be due to diagnostic tests, surgical procedures, gastrointestinal intolerance, feeding tube problems and routine nursing procedures.

Although enteral tube feeding may increase intake in those patients who do not meet their nutritional requirements with oral nutrition, this does not seem to produce consistent benefits in terms of length of stay or mortality rates and the evidence that the complications or cost outweigh the benefits is conflicting.[14] Nasogastric (NG) tubes have significant risks as highlighted by the National Patient Safety Agency (NPSA).[15] They can be misplaced into the lungs (either at original placement or later) leading to severe lung injury if feed is delivered into the airways. Even a correctly placed NG tube has several disadvantages and risks (see **Table 1**). In addition to the physical problems, they may also exacerbate symptoms of agitation in patients with delirium. In our experience, the NG tube is one of the first items to be targeted by the delirious patient. Although not mandatory for confirming correct NG tube placement, X-rays are often required. This has associated costs, introduces delays in provision of nutrition and is an additional source of radiation exposure.

The first step in considering placement of an NG tube should be assessing whether it is actually required. Clearly, if patients with a tracheostomy can be safely fed via the oral route then they may benefit from reduced exposure to the harms and risks of non-oral nutrition.

Our practice

The Royal Bolton Hospital NHS Foundation Trust is located in Bolton, Greater Manchester, in the North West of England. It is a district general hospital serving a population of around 263,000 with 628 inpatient beds. The North West of England has higher than average levels of socio-economic deprivation with associated worse health indices[16] which is reflected in our intensive care population, with admission severity of illness scores consistently above the national average. The intensive care department consists of an 8-bed ICU (level 3) and a 10-bed high dependency unit (level 2). We receive approximately 1,300 admissions per year (430 requiring level 3 care). The ICU has dedicated 24-hour cover by consultant intensivists, and patients are reviewed by a senior clinical dietician at the request of the nursing staff. Our mortality ratio for the period October 2012-March 2013 was 0.84 (95% CI 0.68-1.02, ICNARC model).[17] Since being recorded and published, our mortality ratio as has always had confidence intervals overlapping 1.0, suggesting our clinical effectiveness to be equivalent to UK peers.

We perform between 80 and 100 tracheostomies per year (94 were done last year), the majority being percutaneous dilational procedures done on the unit by the ICU staff. We use tracheostomy tubes with a sub-glottic suction port (Portex Cuffed Blue Line Ultra® Suctionaid, Smiths Medical, UK) and sub-glottic suction is performed every 4-6 hours.

The decision whether to offer oral food to tracheostomy patients is based on a broad judgement of their general clinical condition including an assessment of conscious level, mental capacity and co-operation. If a patient is considered to be likely to succeed with oral feeding (and they consent to a trial) a simple clinical assessment is made using the modified Evans blue dye test. It is recognised that this test has a significant false negative rate, although different studies give widely different estimates of what this might be.[18,19] For patients considered higher risk or where confidence of success is low, then speech and language expertise is accessed and fibreoptic endoscopic evaluation of swallowing considered to inform this judgement. Whether the patient has their tracheostomy cuff inflated or not has low weighting in the overall judgement on whether oral feed is likely to be safe. Our experience concurs with some of the quoted literature in that it seems to make no significant clinical difference. The practice of facilitating selected tracheostomy patients to take oral food has been ongoing for approximately 10 years on our unit.

Ventilator-associated pneumonia

One concern in allowing oral feed in intensive care patients is that the risk of aspiration does result in clinically significant pulmonary complications, such as pneumonia. As part of the daily clinical review we use a screening process for the diagnosis of ventilator-associated pneumonia (VAP) that is based on the clinical pulmonary infection score (CPIS),[20] with a prompt to consider the diagnosis and treatment of VAP when the score is above or equal to 5. This cut-off point on the CPIS score may err on the side of over-diagnosis and over-treatment. However, the best method for surveillance and the ideal balance between sensitivity and specificity is uncertain; one of the reasons that the use of VAP rates as an inter-unit comparator or quality marker is controversial.[21] We monitor our VAP rate as a part of quality improvement efforts, such as adherence to a ventilator care bundle. Our VAP rate for the past six months was approximately 10 per 1,000 ventilator days. On case note review of these ten patients, one of them had a tracheostomy and had taken oral food. We accept that causality is possible, but there is no way to establish such in

one particular case with the evidence that does exist suggesting many patients will aspirate regardless of the presence of a tracheostomy tube.

Patient experience

It is our general observation that most patients who take food orally find it preferable to an NG tube, and the benefits are not only those of reduced exposure to the latter. Being able to physically feed oneself, choosing what to eat and when to stop, enhances patient autonomy. Feeding is seen as a fundamental part of the process of healing and progressing towards a state of normality. The benefits are not universal or guaranteed, however. Some patients find that taste and smell is altered, and that the sensation of swallowing can feel difficult. Nutritional requirements cannot always be met orally and so even if this route is safe, a combination of oral and NG feeding is sometimes considered an acceptable compromise.

Case study

A 50-year-old with tetraplegia from previous trauma was admitted after unrelated emergency surgery. A tracheostomy was placed in anticipation of a long respiratory wean. After more than 40 days of weaning with slow progress, clear oral fluids were given successfully and the patient was then insistent on being fed a pie. Despite the long and fragile nature of the respiratory wean and a desire not to cause further harm, a balanced judgement was made to facilitate this. It was judged that mental capacity was retained by the patient to make such a decision, even though there was the unquantifiable potential for harm. Speech and Language Therapy (SALT) specialists conducted a fibreoptic endoscopic evaluation of swallowing (FEES) during the process of feeding portions of pie. Aspiration was not evident. Oral feed of various food types continued for several weeks with the tracheostomy cuff inflated without apparent disruption to the patient's clinical condition. The positive impact on the patient's psychology and sense of autonomy was clear, see **Figure 1**.

Conclusion

Despite concerns regarding aspiration, there is no certainty that allowing oral intake in selected patients with a tracheostomy tube is harmful. There is little if any strong evidence that cuff inflation significantly increases the risk of serious harm related to aspiration *per se*. Our experience over several years is that offering oral rather than NG tube feeding to selected patients with tracheostomies is well tolerated and has several advantages. We believe it to be the preference of many patients who have experienced both routes. In denying the option for patients in the recovery phase of critical illness to take food orally, the harm and risk of the alternatives must also be considered. Expert assessment and multi-disciplinary decision-making on individual cases is preferable to broadly applied rules. Oral food is a fundamental part of normal life and should not be denied patients without justifiable clinical reasons and without mind to their autonomy.

Conflicts of interests

None. No financial support received.

Figure 1 Photograph of patient being fed normal oral diet by partner.

Consent

Written consent from the patient was obtained for publication of their case report and photograph.

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