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Best evidence topic

Should routine radiological assessment of anastomotic integrity be performed after oesophagectomy with cervical anastomosis? Best evidence topic (BET)

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ABSTRACT

Rates of anastomotic leak in patients who undergo oesophagectomy with cervical anastomosis formation are reported within the literature to surpass those of patients undergoing thoracic anastomosis formation. Though preferred by a number of surgeons, cervical anastomosis is associated with higher rates of anastomotic leak, the consequences of which can be severe. Routine contrast oesophagograms are therefore utilised in a number of institutions as a means of recognising leaks early. They are not without potential complications, however, and the predictive value of contrast imaging has previously been debated. This best evidence topic reviews the use of contrast oesophagograms in screening for cervical anastamotic leak, concluding that their inherent risk of aspiration combined with poor sensitivity should preclude their use as a screening tool. High rates of specificity nevertheless indicate the potential utility of these studies in patients for whom there is clinical suspicion of a leak.

1. Introduction

Oesophageal resection with formation of a cervical anastomosis may be complicated by the development of an anastamotic leak in a significant number of patients [1]. Although considered to be associated with a higher leak rate than their thoracic alternatives, with studies reporting incidence as high as 14%, cervical anastomoses may be favoured as leakage can be restricted to the neck and heal with simple measures such as opening of the wound [2,3]. They are, however, associated with considerable morbidity and mortality in instances in which leakage descends into the posterior mediastinum [2,3]. Given this, a number of centres advocate routine postoperative evaluation of the cervical anastomosis with barium or water soluble contrast medium. However, oesophageal anastomotic leaks can present before the scheduled timing of routine contrast study and in addition oral contrast media is not without associated morbidity from aspiration. Its routine use has therefore been questioned, not least because of the additional potential for false negative results.

We therefore sought to review the routine use of radiological assessment of the integrity of cervical anastomoses formed following oesophagectomy by constructing a best evidence search according to a structured protocol, as has been outlined within an article published within the *International Journal of Surgery* [4].

2. Clinical scenario

You perform a potentially curative oesophagectomy with cervical anastomosis for a patient with oesophageal malignancy. It is standard practice in the Upper GI Unit you are working in to exclude leakage from the cervical anastomosis prior to advancing oral intake by undertaking a formal oral contrast study during the post-operative period. However, you have had experience of working in other Upper GI units where routine contrast studies

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were not performed. You resolve to review the literature in order to determine which approach is in your patients' best interests.

3. Three-part question

In patients undergoing oesophagectomy and cervical anastomosis formation does routine assessment using a contrast study improve the timely detection of anastomotic leak without incurring significant complications?

4. Search strategy

A Medline search limited to the time period of 1st January 1946 to 1st April 2014 was operated using the Ovid interface probed for the following terms: oesophagectomy ([All Fields] or oesophageal neoplasia [All Fields]) AND (cervical anastomosis) AND (contrast OR contrast media OR leak OR leakage OR integrity OR dehiscence) AND (outcome). Results were limited to papers published in the English language and those relating to Humans. Any manuscript addressing the use of contrast to assess anastomotic integrity following an oesophagectomy was assessed in detail.

5. Search outcome

One hundred and eighty eight papers were found using the described search strategy, after which abstracts were reviewed by the authors in order to identify relevant manuscripts. Of these, five manuscripts were identified that related to the routine assessment of anastomotic integrity in patients who underwent oesophagectomy with cervical anastomosis formation. Articles relating to the use of both water soluble and barium contrast media were included in the analysis. Those relating to radiological investigations from intra-thoracic anastomoses were, however, excluded unless results were specifically noted to additionally relate to cervical anastomoses.

6. Discussion

Five level IV studies, four of which were retrospective and one of which featured prospectively collected data, were identified to be relevant to the research question, as demonstrated in Table 1.

Goel and colleagues performed the first relevant analysis of this topic in their 1995 prospective review of 25 patients undergoing oesophagectomy or oesophageal bypass for oesophageal carcinoma, all of whom received cervical anastomosis formation [5]. Favouring the use of gastrografin on the fifth postoperative day to test the integrity of anastomoses, the authors reported a true leak rate of 3/25 (12%). One (33%) of these cases was identified through radiographic means despite contrast swallow suggestive of leaks in an additional two cases, suggesting a false positive proportion of 66%. Of the 21 studies negative for a leak, 20 were true negatives whilst one failed to identify a clinically-apparent leak, reflecting a false negative proportion of 4.8%.

Perhaps of greater concern, Goel and colleagues were not able to conclude on the contrast swallow of one patient (4%), who was subsequently diagnosed to have a leak via clinical means, due to significant aspiration. The apparent risk of aspiration following contrast swallow administration is supported by three of the further four manuscripts reviewed in this analysis. In their 2005 analysis of 143 patients who underwent oesophagectomy with formation of cervical anastomosis, for example, Tirnaksiz and colleagues report an aspiration rate of 17.4% (25/143), with two patients subsequently developing hospital acquired pneumonia [6].

This analysis, which reports on a single-site routinely using gastrografin swallow between postoperative days seven and nine, provides data for both intrathoracic and cervical anastomoses. Of the 143 patients with a cervical anastomosis, 32 (22.4%) experienced a true anastomotic leak. The proportion of these diagnosed by clinical and radiological means was relatively comparable, at 56.3% and 43.7% respectively. The fraction of false positive results reported by this analysis is significantly lower than that described by Goel et al., with only five (26.3%) of the 19 radiologically diagnosed leaks failing to present clinically. In contrast, of the 124 contrast swallow results reported to exclude a leak, just 18 (14.5%) registered as false negatives.

These data are combined to present respective sensitivity and specificity for gastrografin swallow of 43.7% and 95.4%, with a positive predictive value of 73.6% and negative predictive value of 85.4%. Remarkably, Boone and colleagues' analysis of aqueous contrast swallow used between the seventh and tenth postoperative days in 252 patients with a cervical anastomosis reports similar specificity and sensitivity of 92% and 52% respectively, albeit with a relatively more disappointing positive predictive value of 46% and a broadly consistent negative predictive value of 93% [7]. Of the 26 contrast swallows reported positive for anastomotic leak, fourteen (53.8%) were subsequently identified to be false. Eleven of the 163 negative radiographic studies were subsequently clinically identified to have a leak, representing a false negative fraction of 6.8% which is roughly half that described by Tirnaksiz et al.

In reporting these figures, Boone et al. further echo concerns regarding aspiration risk with 45 (22%) of the 207 swallow tests they employed resulting in aspiration, though none led to aspiration pneumonia or pulmonary oedema. Interestingly, contrast swallow assessment was not performed in 45 (18%) of the total cohort, either because of an extended stay within the intensive treatment unit (31) or because the leak was diagnosed either by clinical means (10) or alternative imaging (4) prior to planned oral contrast study.

A larger retrospective study has been conducted by Cooke et al. [8] This retrospective analysis of 1133 patients who underwent transhiatal oesophagectomy within a single centre for benign (241) and malignant (892) indications over a six year period identified a total true anastomotic leak incidence of 13.2%. Of these 150 patients, 38.7% are reported to have had their wounds opened following a clinical diagnosis of a leak prior to a scheduled contrast swallow, as also occurred in Boone's series.

In those who routinely underwent contrast swallow assessment, the proportion of false negative reports was approximately 6.5% which, whilst in line with Goel and Boone's assessments, is significantly lower than figures reported by Tirnaksiz et al. Interestingly, four (2.7%) contrast swallow examinations were reported to be indeterminate followed by subsequent clinical diagnosis of an oesophageal anastomotic leak.

Describing the 17 (1.6%) patients for whom barium swallow identified pathology other than a leak which required intervention, Cooke et al. note myriad other benefits of their use. Eleven patients are identified to have radiographic small bowel obstructions at the level of the feeding jejunostomy tube, for example, which resulted in eight jejunostomy feeding tube removals, two feeding tube downsizings and one exploratory laparotomy. Additional note is made of four patients with gastric conduit abnormalities and one patient with radiographic delayed pyloric emptying which necessitated subsequent balloon dilatation. Cooke's analysis concludes that, whether through identifying a leak or other complication, contrast swallow influenced management in 39 (3.8%) of the 1040 patients studied.

In the most recent of the studies analysed, Solomon et al. report the use of water soluble or barium contrast in 132 patients within a single centre over a 14 year period [9]. Unlike previous studies, the cohort described by Solomon et al. received anastomotic