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Best evidence topic

Should routine assessment of anastomotic integrity be undertaken using radiological contrast swallow after oesophagectomy with intra-thoracic anastomosis? Best evidence topic (BET)

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ABSTRACT

Thoracic anastomotic leak is associated with significant postoperative morbidity and mortality. Routine contrast oesophagograms are consequently employed by a number of centres to routinely screen for this complication yet there exists little consensus as to if and when this assessment should occur. We have demonstrated within this BestBET analysis of five level IV case series that routine contrast oesophagograms lack adequate sensitivity or positive predictive value to be effective as screening tools, with leaks often arising clinically prior to scheduled routine assessment. We additionally demonstrate the significant risk of aspiration associated with contrast swallow use. The use of contrast swallow studies as diagnostic tools in patients for whom a leak is considered likely on the basis of clinical examination is nevertheless supported by relatively greater negative predictive values and specificity reported within the literature. There is additional evidence to support the use of CT imaging with oral contrast and endoscopic assessment of the anastomosis as valuable tools to assess for anastomotic integrity.

1. Introduction

The development of a leak from a thoracic anastomosis is a significant source of morbidity and mortality amongst patients who undergo oesophageal resection [1,2]. Given the severity of complications associated with thoracic anastomoses, a number of centres advocate the use of routine postoperative oesophagograms in order to afford the early recognition of anastomotic leak [2–4]. There exists no consensus within the literature as to if or when this imaging should be undertaken, however, and there are well documented concerns regarding both its safety and sensitivity. We performed a best evidence search to determine the efficacy of routine contrast swallow following oesophagectomy with intra-thoracic anastomosis formation.

2. Clinical scenario

You perform a curative oesophagectomy with an intra-thoracic anastomosis on a patient with oesophageal cancer. It is standard practice within your Upper GI Unit to routinely assess the integrity of anastomoses with a formal contrast oesophagram prior to advancing oral intake. You have experience working within centres which do not routinely perform oral contrast studies and therefore resolve to review the literature in order to determine which approach is in your patient's best interests.

3. Three-part question

Does the use of routine contrast swallow assessment to assess for anastomotic leak improve outcome in patients undergoing oesophagectomy with formation of an intra-thoracic anastomosis?

4. Search strategy

A Medline search was carried out according to a structured

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BestBET protocol [5]. The Ovid interface was probed for the following terms: (oesophagectomy [All fields] or oesophageal malignancy) AND (thoracic anastomosis OR intra-thoracic anastomosis) AND (contrast OR contrast media OR leak OR leakage OR integrity OR dehiscence) AND (outcome). Results were limited to those published between 1st January 1946 and 1st June 2014, which related to Humans and which were published in the English language. Any manuscript addressing the use of contrast to assess for anastomotic leak post-oesophagectomy was assessed in detail. Manuscripts which addressed only the assessment of cervical anastomotic integrity were excluded from this analysis, as were manuscripts which addressed both cervical and thoracic leaks without specific sub-analysis for location of anastomosis.

5. Search outcome

Abstracts were reviewed in detail by the authors and manuscripts relating to differing radiological techniques for the assessment of anastomotic integrity excluded unless analysis was directly afforded to contrast swallow assessment. Articles relating to the use of both barium contrast and water soluble contrast media were included in the analysis. Manuscripts were stratified by their level of evidence and the highest level available sought. Studies which were of an equivalent level or one level below this were actively identified for inclusion, in line with common practice for BestBET methodology [5].

One hundred and twenty eight manuscripts were identified using the described search strategy, seven of which were identified to be directly relevant to the topic of routine contrast assessment in identifying thoracic anastomotic leak post-oesophagectomy. One hundred and five manuscripts were excluded from analysis because they did not relate to the use of oral contrast, one because oral contrast was not employed as a screening tool and five because they related to the assessment of cervical anastomoses. A further seven manuscripts were review articles and therefore excluded from analysis, in addition one manuscript was excluded as it did not meet criteria for level of evidence and two because they were not English language articles.

6. Discussion

The authors of this BestBET have previously reviewed the use of routine radiology in the assessment of the integrity of cervical anastomoses post-oesophagectomy [6]. However, intra-thoracic anastomosis is a much more common technique, especially in Western Countries with a higher incidence of lower oesophageal adenocarcinoma. The site of anastomosis affects the likelihood of leakage and the manifestations are clinically different. Further, despite evidence to suggest a greater incidence of leaks from cervical anastomoses, leakage from thoracic anastomoses is relatively less contained and may rapidly contribute to mediastinitis and subsequent death [7].

Five level IV papers summarising 1057 patients spread across five case series were identified which analysed of the role of routine contrast swallow studies in determining intra-thoracic anastomosis integrity. As summarised within Table 1, data was prospectively collected within four of these series. Level IV evidence includes case-series and, in most definitions, poor quality cohort and case-control studies. There were no higher levels of evidence available. Level V evidence (expert opinion) was not included in this review.

Griffin et al. reported on 291 patients for whom data was prospectively collected over a ten year period following oesophagectomy with stapled intrathoracic anastomosis [3]. Of these, 139 (47.8%) were operated on prior to May 1997 and underwent routine water-soluble contrast swallow screening which was followed by barium swallow in the absence of an identifiable leak. The authors state that the remaining 152 (52.2%) patients operated on following this date underwent contrast swallow assessment only if considered clinically indicated as a result of intraoperative difficulties or a clinical suspicion of a leak. The authors attribute this change in procedure to both an anecdotal institutional recognition of patients presenting clinically with leaks following normal contrast screening assessment and two cases of aspiration bronchopneumonia following routine examination.

Of the nineteen mediastinal leaks which occurred within the entire cohort (6.5% of the 291 patients analysed), ten developed within the contrast swallow group and nine within the non-routine swallow group. Only one (10%) leak was identified by routine contrast imaging, whereas its more directed use on the basis of clinical suspicion identified two (22.2%) of the three leaks not conclusively identified by clinical means in patients undergoing operative intervention following May 1997.

Griffin et al. provide an additional comparison between routine contrast swallow and endoscopic evaluation, highlighting that the remaining clinical leak within the non-routine swallow group was identified via endoscopic means. Summarising the entire cohort, both contrast swallow and endoscopy are noted to confirm the presence of an anastomotic or gastrostomy line leak, whereas the four leaks occurring as a result of gastric necrosis were identified by endoscopy but missed with contrast assessment.

A larger, albeit retrospective, case series published by Tirnaksiz et al., in 2005 reviews 505 patients who underwent oesophagectomy between January 1991 and 1995 [8]. Three hundred and twenty one (69%) of these patients underwent intrathoracic anastomosis formation, all of whom received routine gastrografin swallow assessment between postoperative days 4–11. Supporting Griffin and colleagues' concern regarding aspiration risk, Tirnaksiz et al. report five (1.5%) patients who suffered clinically significant aspiration, albeit with no reports of associated morbidity or mortality.

Ten (3.1%) of the 321 patients with a thoracic anastomosis were considered to have a true anastomotic leak, though only three (30%) of these were identified following routine contrast oesophagogram. This is despite a further seventeen false positive oesophagogram reports, contributing to an overall false positive rate of 5.4% and positive predictive value of 15%. In contrast, 294 (97.7%) of the 301 radiographic studies correctly excluded a leak, underlining a false negative rate of 70% and negative predictive value of 97.6%. Tirnaksiz et al. additionally highlight that the sensitivity of gastrografin swallow amongst the patients included within their series was 30%, with a specificity of 94.5%.

Sarela et al. report sensitivity of 29% amongst 103 patients with thoracic anastomoses who underwent routine contrast imaging via water soluble contrast administration on the seventh postoperative day [9]. Again highlighting discrepancy between the specificity and sensitivity of contrast oesophagograms, their negative predictive value is reported at 95%. These figures are generated on a background of 13/97 (13.4%) patients experiencing true oesophageal leaks, only one (7.7%) of which was diagnosed via routine screening swallow assessment.

Citing concerns over the ability of postoperative patients to tolerate fluoroscopy, Hogan et al. provide a prospective single centre comparison of routine contrast swallow assessment, CT imaging and endoscopy as means to identifying leaks within a relatively small cohort of thirty eight patients [10]. Eight (21.1%) of the patients included within this analysis experienced a true anastomotic leak. Seven of these (87.5%) were recognised by both routine contrast swallow assessment and CT imaging with oral contrast. Only two also underwent endoscopy but in both instances the leak was recognised. There were, in addition, three false