

RADIOLOGICAL EVALUATION OF ESOPHAGEAL FUNCTION IN DYSPHAGIA WITH SPECIAL EMPHASIS ON ACHALASIA

Akademisk avhandling

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av

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Avhandlingen baseras på följande delarbeten:

- I. Kostic S, Andersson M, Hellström M, Lönroth H, Lundell L.
Timed barium esophagogram in the assessment of patients with achalasia: Reproducibility and observer variation.
Diseases of the Esophagus 2005; 18: 96-103.
- II. Andersson M, Kostic S, Ruth M, Lönroth H, Kjellin A, Hellström M, Lundell L.
Characteristics of the timed barium esophagogram in newly diagnosed idiopathic achalasia. Clinical and manometric correlates.
Acta Radiol 2007; 48: 2-9.
- III. Andersson M, Lundell L, Kostic S, Ruth M, Lönroth H, Kjellin A, Hellström M.
Evaluation of the response to treatment in patients with idiopathic achalasia by the timed barium esophagogram: results from a randomized clinical trial.
Provisionally accepted for publication in Diseases of the Esophagus.
- IV. Bergquist H, Andersson M, Ejnell H, Hellström M, Lundell L, Ruth M.
Functional and radiological evaluation of free jejunal transplant reconstructions after radical resection of hypopharyngeal or proximal esophageal cancer.
World Journal of Surgery 2007; 31: 1988-1995.



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Abstract:

In idiopathic achalasia, degeneration of the inhibitory innervation of the esophageal smooth muscle results in absence of primary peristalsis and in incomplete relaxation of the lower esophageal sphincter (LES). All treatments for achalasia aim at reducing the pressure gradient across the LES, thus facilitating esophageal emptying by gravity. Objective evaluation of the response to treatment is important, since persistent poor emptying may lead to progressive deterioration of esophageal function. The timed barium esophagogram (TBE) has been introduced as a standardized technique for evaluating esophageal emptying in patients with achalasia and the aim of the present thesis was to validate this new diagnostic test.

I. In order to investigate the reproducibility and observer variation of TBE, 21 patients with achalasia were examined by repeat TBE median 8 days apart. Radiographs of the esophagus were taken 1, 2 and 5 minutes after patients had ingested 250 ml of barium. The height and width of the barium column and the rate of change over time were recorded. The static parameters were reproducible between studies, but the dynamic data were not (correlation coefficient of only 0.50). There was excellent intra- and interobserver agreement for all measured variables. Control subjects (n= 8) uniformly achieved complete esophageal emptying within 2 minutes.

II. To describe TBE characteristics in patients with newly diagnosed achalasia, and to correlate these to clinical and manometric variables, 46 patients were examined. All patients showed markedly delayed emptying of barium from the esophagus. Emptying, expressed as volume of barium, showed significant inverse correlation with the resting and the maximal relaxing pressure of the LES at manometry ($r = -0.34$ and $r = -0.54$, respectively) and with the duration of symptoms ($r = -0.36$).

III. TBE was prospectively applied in a randomized trial comparing pneumatic dilatation (n= 26) and laparoscopic myotomy (n= 25) in patients with newly diagnosed achalasia. Following therapy, TBE parameters did not differ significantly between treatment groups. Significant correlations were found between the height of the barium column at 1 minute and the symptom scores for "dysphagia for liquids" ($r = 0.47$), "chest pain" ($r = 0.42$) and the "Watson dysphagia score" ($r = 0.46$) at the end of follow-up (median 18 months). Patients with less than 50% improvement in barium column height at 1 minute had a 40% risk of treatment failure during follow-up.

IV. A modified TBE-technique was applied in a case series of 7 patients operated for hypopharyngeal or proximal esophageal cancer with radical resection and reconstruction with a free jejunal transplant. Radiographic signs of disturbed bolus transport through the jejunal transplant were found in all patients, but the patients only reported mild dysphagia symptoms on clinical assessment. One possible explanation for this discrepancy might be diminished visceral sensation in the denervated jejunal transplant.

In conclusion, we found that TBE is an easily performed and reproducible technique for the objective evaluation of esophageal emptying before and after treatment for achalasia. However, the impact of routinely performing TBE on the long-term outcome of achalasia patients needs to be studied in further prospective trials.

Keywords: Achalasia, dysphagia, radiography, barium esophagogram, reproducibility of findings, observer variation, esophageal neoplasms, laparoscopic myotomy, balloon dilatation.

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