

INTRODUCTION

The tracheoesophageal voice prosthesis (TEP) is a commonly used device for alaryngeal voicing following total laryngectomy. Variability in TEP voice and speech production may be reflected in differences in intratracheal pressures. The purpose of this investigation was to examine the relationship between intratracheal pressures, speech function and proximal esophageal abnormalities in patients with TEP.

OBJECTIVE

To examine the relationship between intratracheal manometric pressure (IMP), speech function and proximal esophageal abnormalities in patients with TEP.

DESIGN, SETTING, PARTICIPANTS

Intratracheal manometric pressures were obtained for all patients with a history of total laryngectomy undergoing routine TEP change between 9/9/2019 and 12/4/2019. Intratracheal manometric pressures during sustained phonation, conversational speech and maximum loudness tasks were obtained. Pressure metrics, phonation duration time and fluency of speech production were compared between patients with dysphagia to those without swallowing complaints. The relationship between pressure and speech metrics were also assessed.

MAIN OUTCOMES

IMPs during sustained phonation, conversational speech, and maximum loudness tasks were obtained for twenty-two patients. Pressure metrics, phonation duration time, and fluency of speech production were compared between patients with dysphagia to those without swallowing complaints. The relationships between pressure and speech metrics was also assessed.



Fig 1. Blom-Singer intratracheal manometer



Fig 2. Blom-Singer manometer with manometer adaptor and tracheostoma adhesive housing

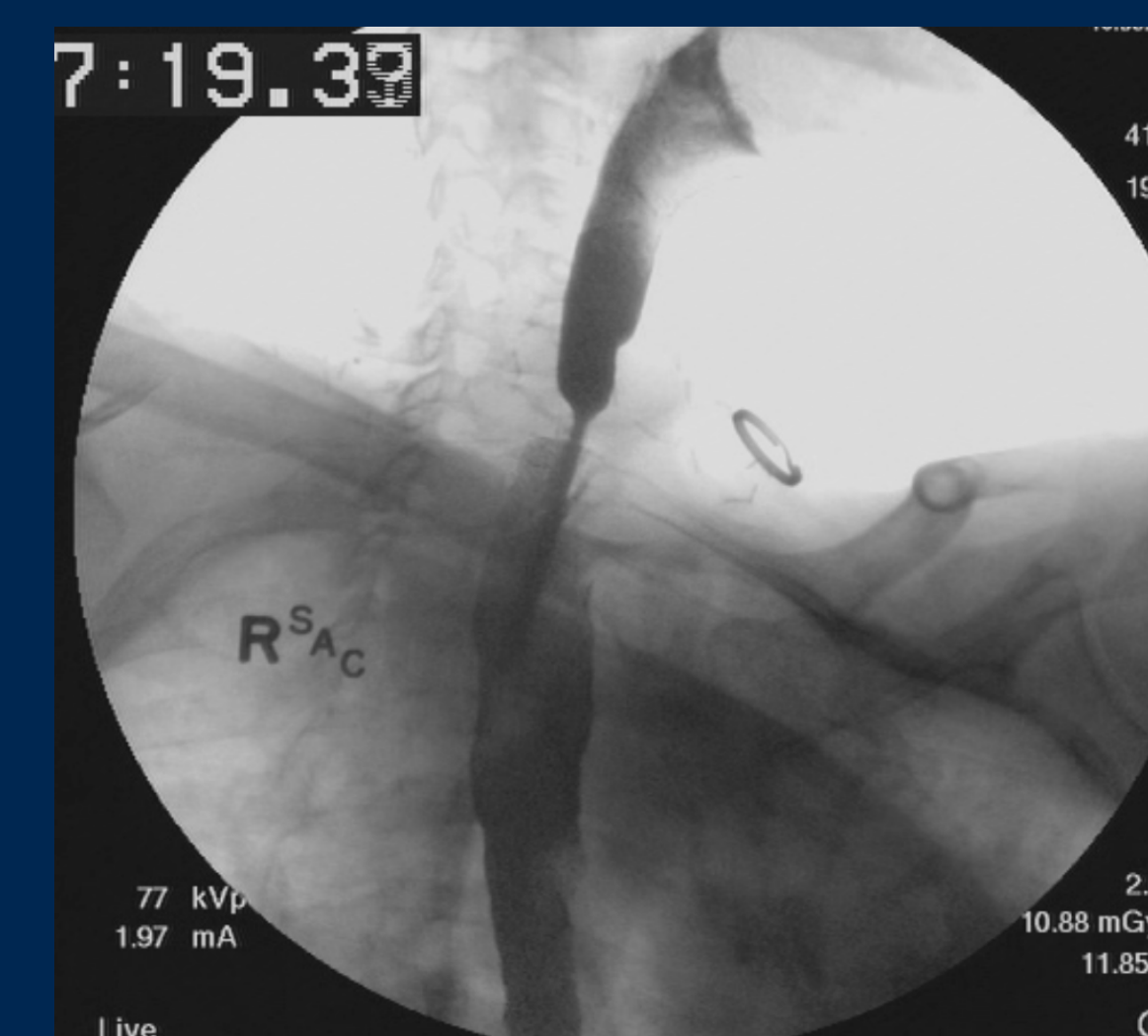


Fig 3. Stricture of the proximal esophagus in the RAO position

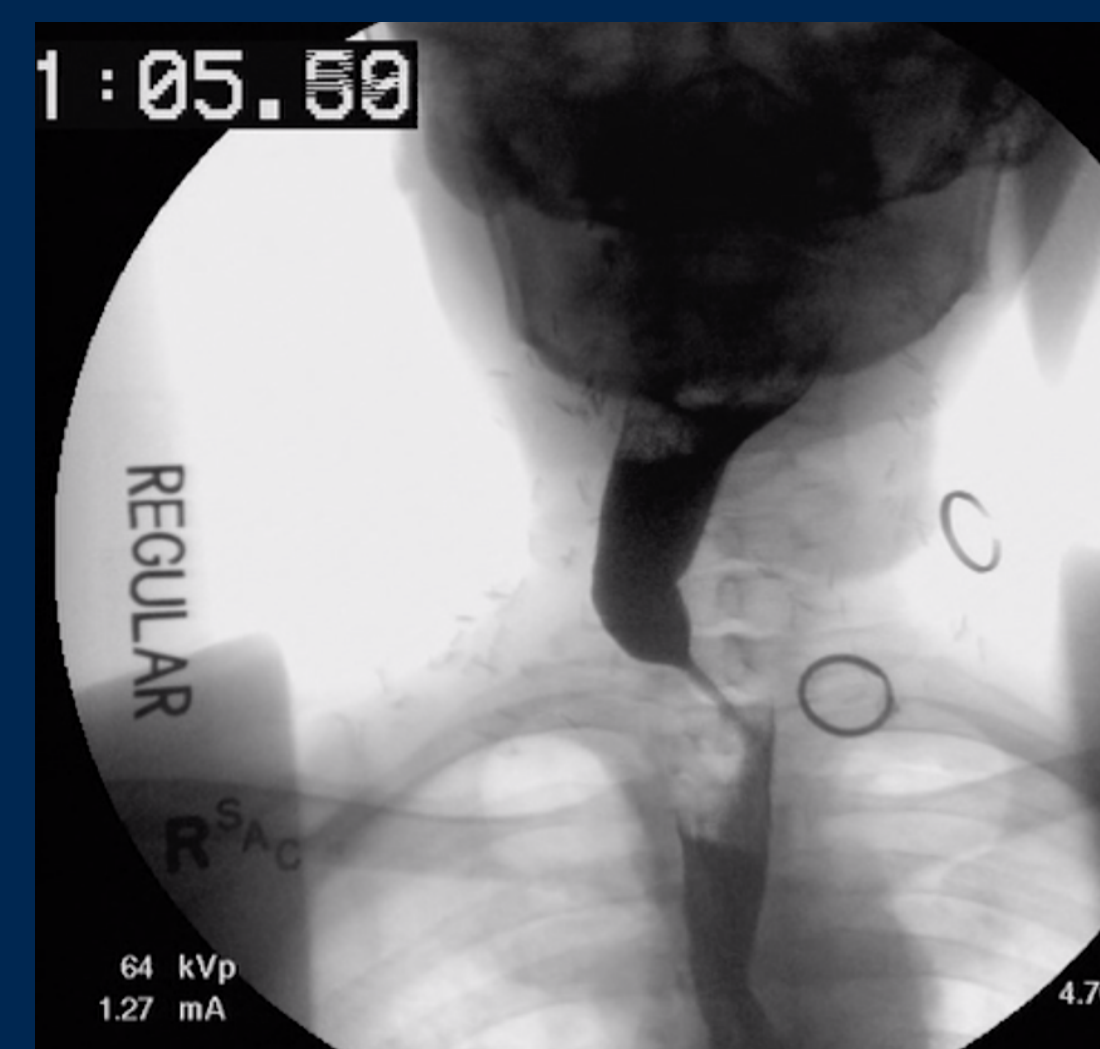


Fig 4. Stricture of the proximal esophagus in the anteroposterior plane

RESULTS

The mean age (SD) of the cohort was 66.6 (± 8.8) years. Seventy seven percent were male. Mean sustained phonation duration time was 9.3 sec (± 5.2) and intratracheal pressure during sustained phonation was 50.5 cm H₂O (± 21.4). Intratracheal manometric pressures during sustained phonation, conversational speech and maximum loudness tasks were highly correlated ($p < 0.05$). Increased intratracheal pressure during sustained phonation and conversational speech correlated with decreased sustained phonation duration time ($p < 0.05$). Phonation duration was significantly shorter for patients with dysphagia and radiographically confirmed abnormalities of the proximal esophagus ($p < 0.05$). All patients with non-fluent TEP speech production had structural abnormalities of the proximal esophagus. No difference in pressure or speech metrics was observed for primary closure versus reconstructive flap type.

CONCLUSION AND RELEVANCE

Increased IMP and abnormalities of the proximal esophagus were associated with worse TEP speech quality. Evaluation of the esophagus should be considered in patients experiencing difficulties with TEP voicing. Further investigation of intratracheal manometry as a biofeedback tool to improve TEP voicing is needed.

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