



ANALYSIS OF VIDEOFLUOROSCOPIC VARIABLES AFFECTING SWALLOWING SAFETY AND EFFICIENCY IN OPHL PATIENTS

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INTRODUCTION

Open partial horizontal laryngectomy (OPHL) could represent a valuable alternative to total laryngectomy for selected laryngeal carcinoma. In long-term, occasional aspiration ranges from 12.9 to 67% after OPHL [1]. Rate of aspiration pneumonia can reach the 21.7% [2]. Main causes of swallowing impairment vary from a defective glottic closure to a reduced upper esophageal sphincter (UES) opening. At the present time, only one study analysed spatial and temporal videofluoroscopic variables to evaluate factors affecting postoperative aspiration. No studies before have compared videofluoroscopic variables between OPHL patients with and without dysphagia.

DATA COLLECTION

1) Swallowing function was assessed throughout videofluoroscopic examination (25 frame/sec) using 10 ml of liquid, pureed and solid bolus.

2) 10 spatial, temporal and scalar parameters were selected [3]

SPATIAL PARAMETERS		TEMPORAL PARAMETERS		SCALAR PARAMETERS	
POL	PES (pharyngoesophageal segment) opening duration	TPT	Total pharyngeal transit time	I	Initiation of the pharyngeal swallow
HMR	Hyoidomandibular distance at rest	POD	PES opening duration	EP	Epiglottic movement
HMS	Hyoidomandibular distance during swallow			LC	Laryngeal closure
HVS	Hyoidovertebral distance during swallow			TBR	Tongue base retraction

3) Efficiency and safety of swallowing were assessed through the **Dynamic Imaging Grade of Swallowing Toxicity scale** [4]:

SAFETY GRADE (Maximum Penetration/Aspiration scale score)

GRADE 0	GRADE 1	GRADE 2		GRADE 3	GRADE 4
PAS 1-2	PAS 3-4	PAS 5-6	PAS 7-8	PAS 7-8	PAS 7-8
No pen/asp or flash pen above	Silent pen above TVF or flash pen to TVF	Chronic silent pen to TVF or flash asp	Intermittent Asp not cleared, silent or sensate	Chronic or gross Asp not cleared, silent or sensate	Chronic and gross Asp not cleared, silent or sensate

SAFETY > 2 → UNSAFE SWALLOWER

EFFICIENCY GRADE (Maximum % of pharyngeal residue)

GRADE 0	GRADE 1	GRADE 2	GRADE 3		GRADE 4
<10%	10%-40%	50%-90%	50%-90%	>90%	>90%
Minimal to no residue	Less than half residue	Majority residue on cracker and/or cookie	Majority residue on liquid and/or pudding	Near complete residue on any (but not all) bolus	Near complete residue on all type of bolus

EFFICIENCY > 2 → INEFFICIENT SWALLOWER

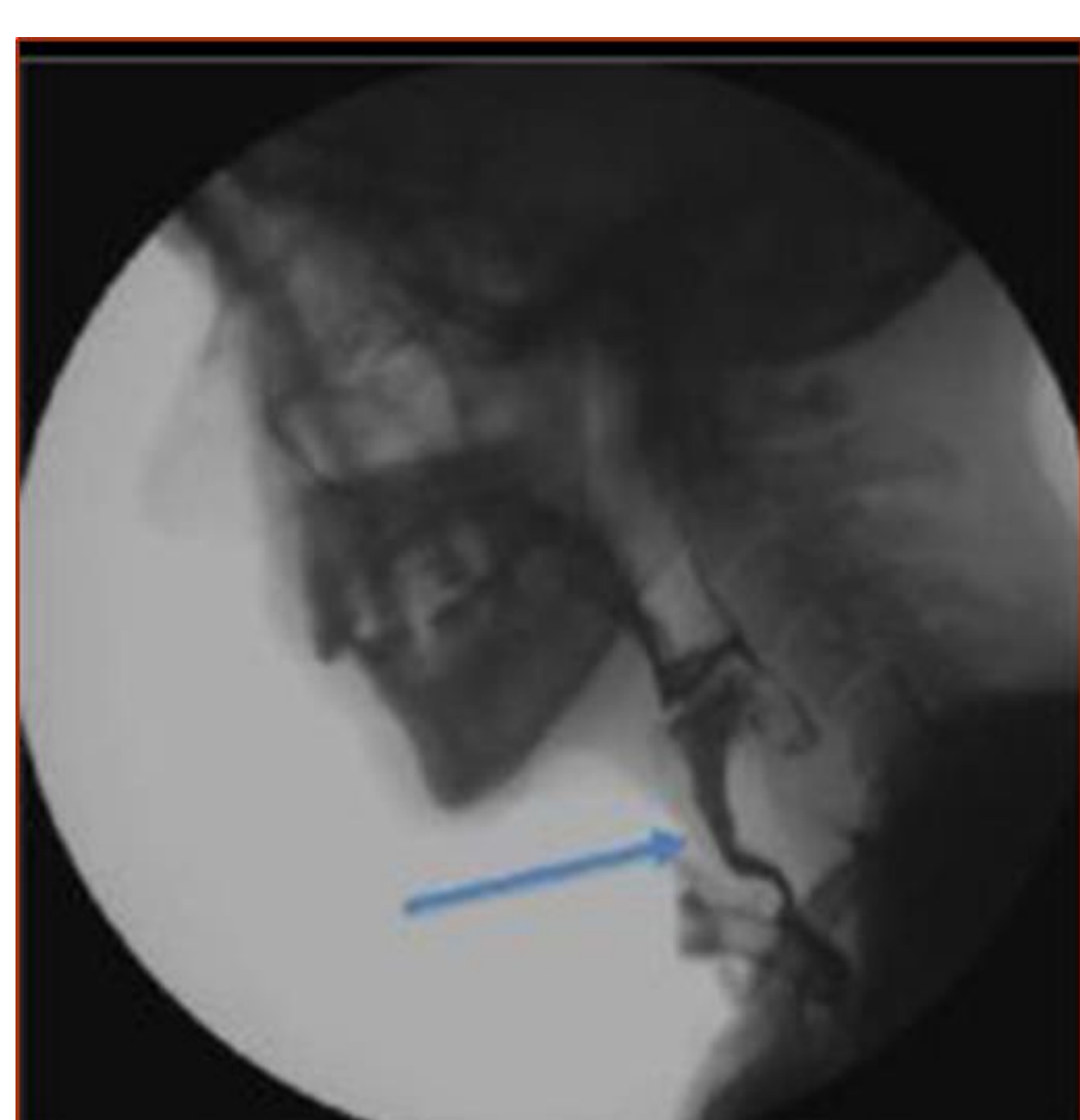
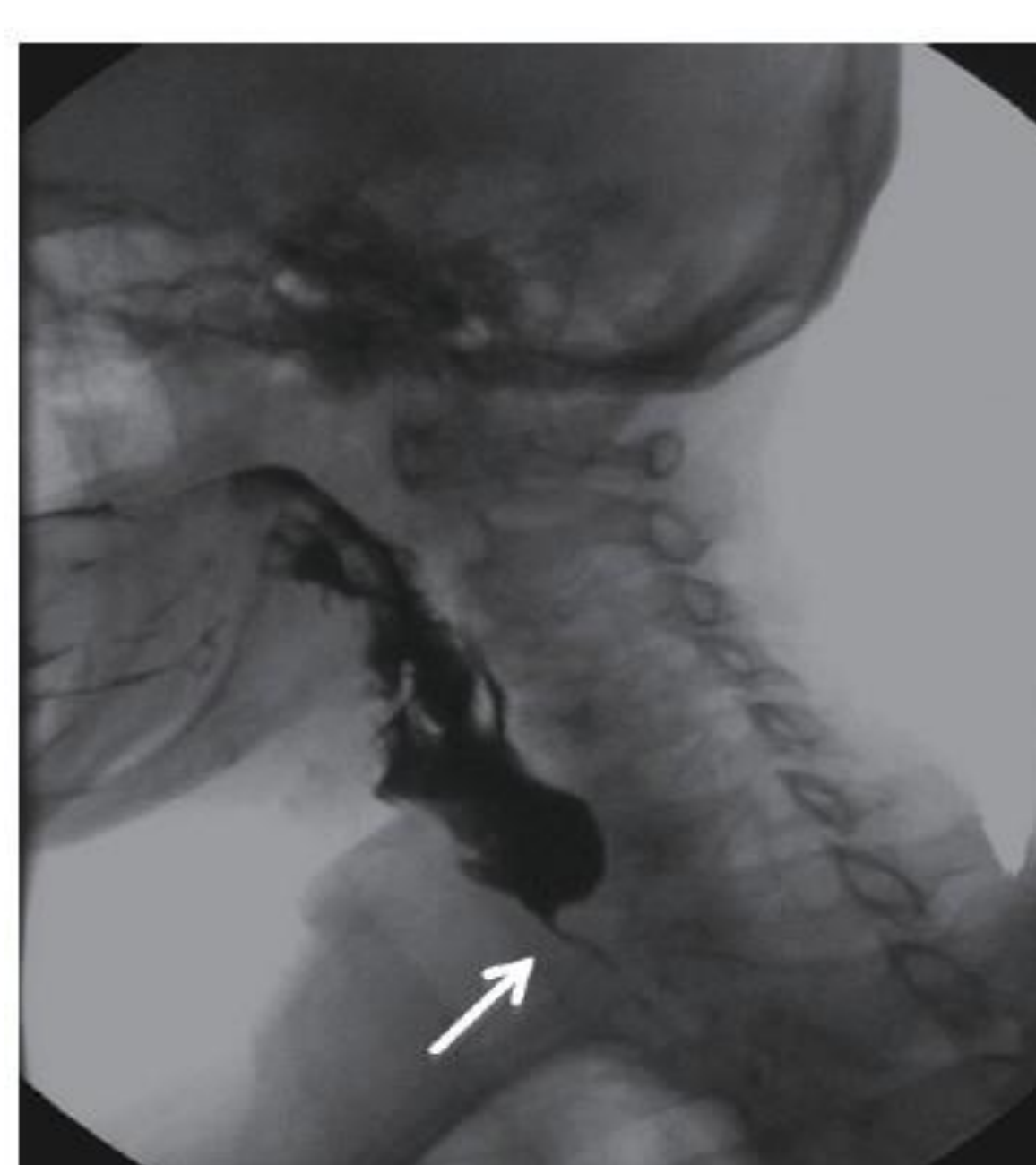


Fig.1.: Videofluoroscopic image of unsafe swallow

Fig.2.: Videofluoroscopic image of inefficient swallow



AIM

The study aim to examine factors affecting safety and efficiency of swallowing in OPHL type IIa (supracricoid laryngectomy with cricohyoidoepiglottopexy) patients, by analysing temporal and spatial videofluoroscopic parameters.

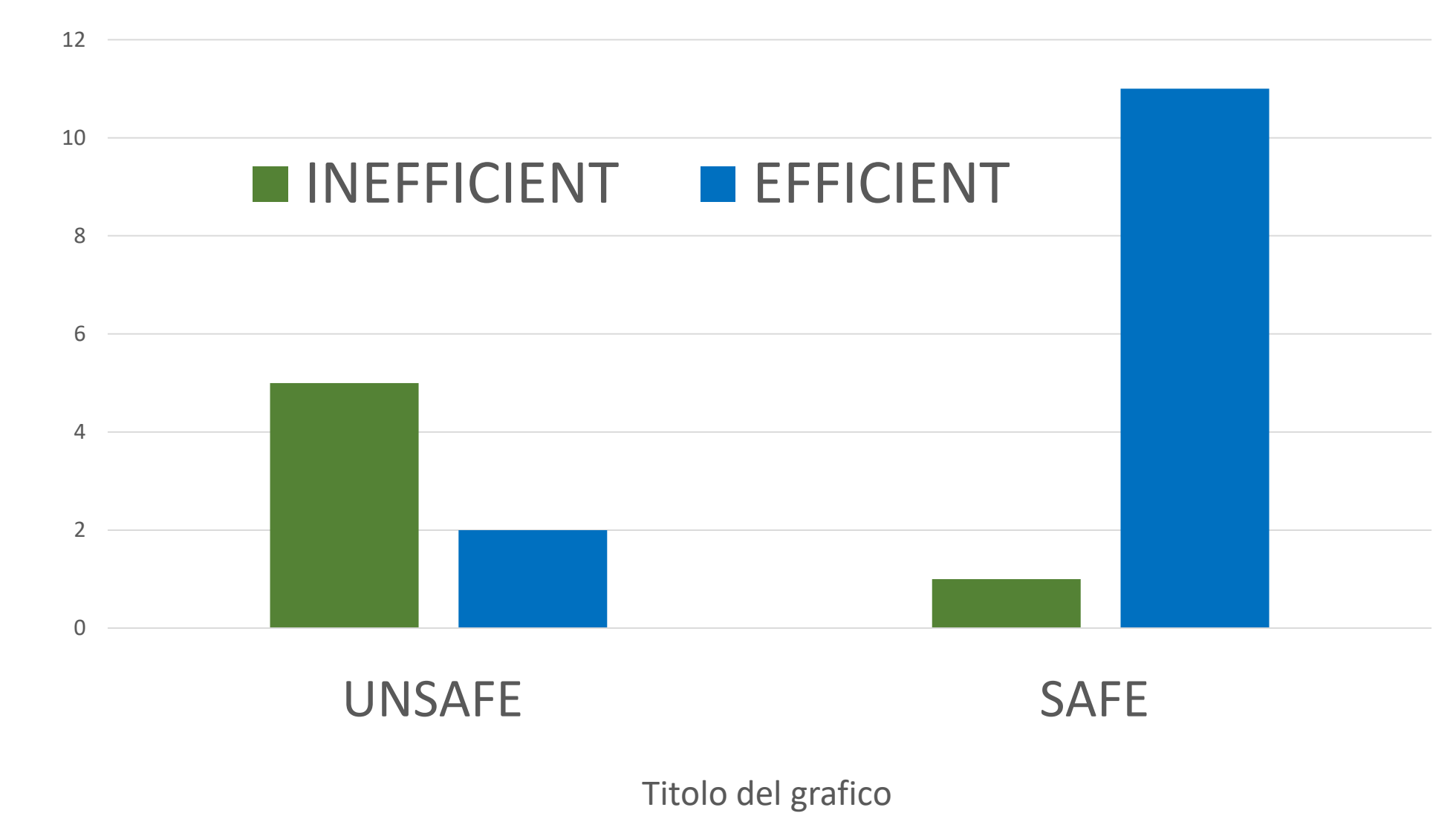
POPULATION

Inclusion criteria were: male, OPHL IIa surgery, over 6 months from surgery, arytenoid resection, no evidence of disease at the last follow-up, nonenteral feeding (percutaneous endoscopic gastrostomy or nasogastric tube), absence of the tracheostoma, no salvage total laryngectomy performed. Overall, **19** patients with an OPHL type IIa were included. Mean age at the time of the assessment was 66±12.3 (51-82), mean distance from intervention was 23 ±18.4 (5-54).

RESULTS

36.84% (7 subjects) of the sample showed an unsafe swallowing and **31.57% (6 subjects)** an inefficient swallowing.

In this sample, patients with an impaired safety were found to have a **moderate degree of pharyngeal residue** (inefficient swallow) $p=0.0036$.



Furthermore, the **83,31% (5 subjects)** of patients affected by inefficient swallowing were also unsafe.

LC parameter distribution showed a significant difference in relation to the safety score ($p=0.013$). The worse the larynx closure impairment, the higher the score

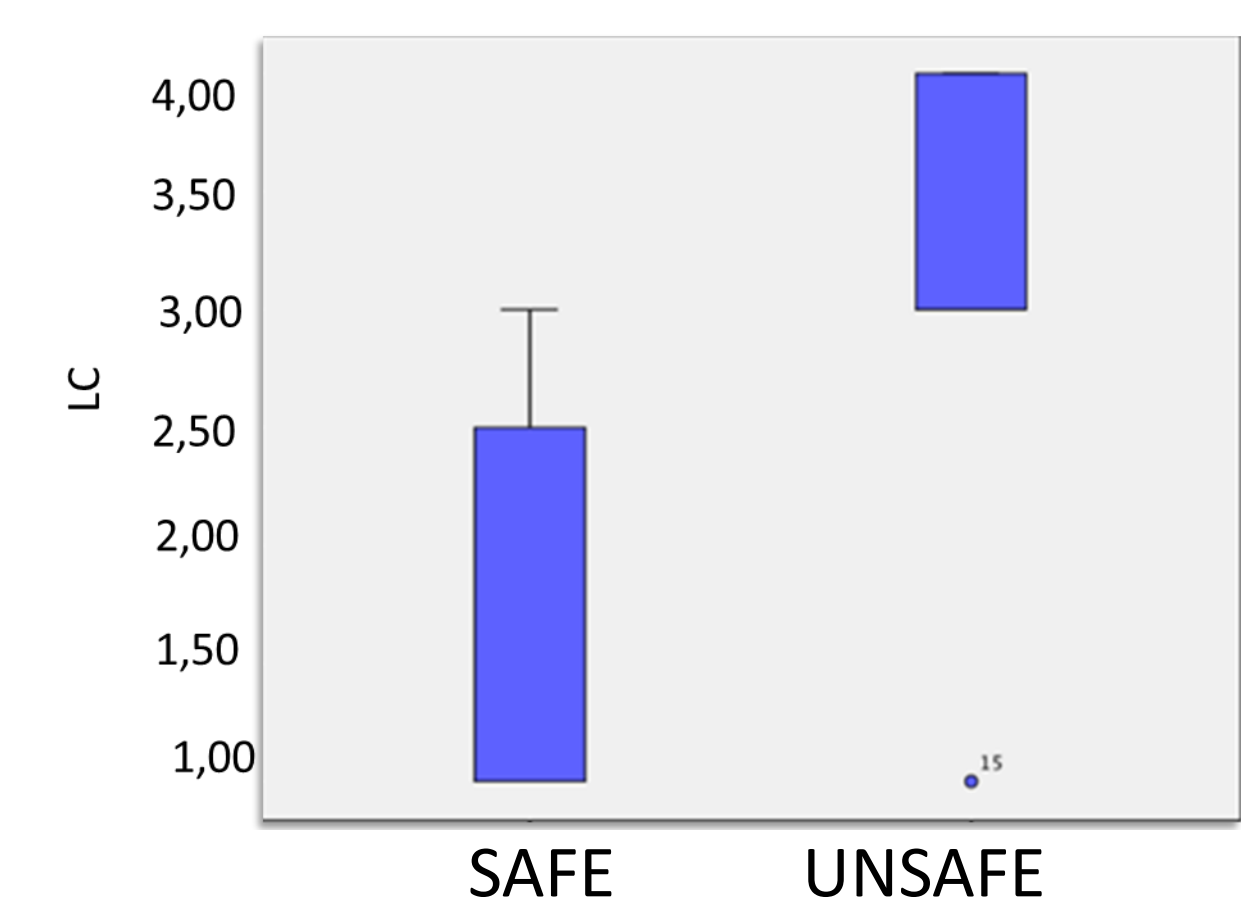


Fig.4: LC distribution in relation to safety score

Patients with an impaired efficiency were found to have a higher TPT ($p=0.009$) and a shorter HMS ($p=0.005$), POL ($p=0.012$) and TBR ($p=0.017$).

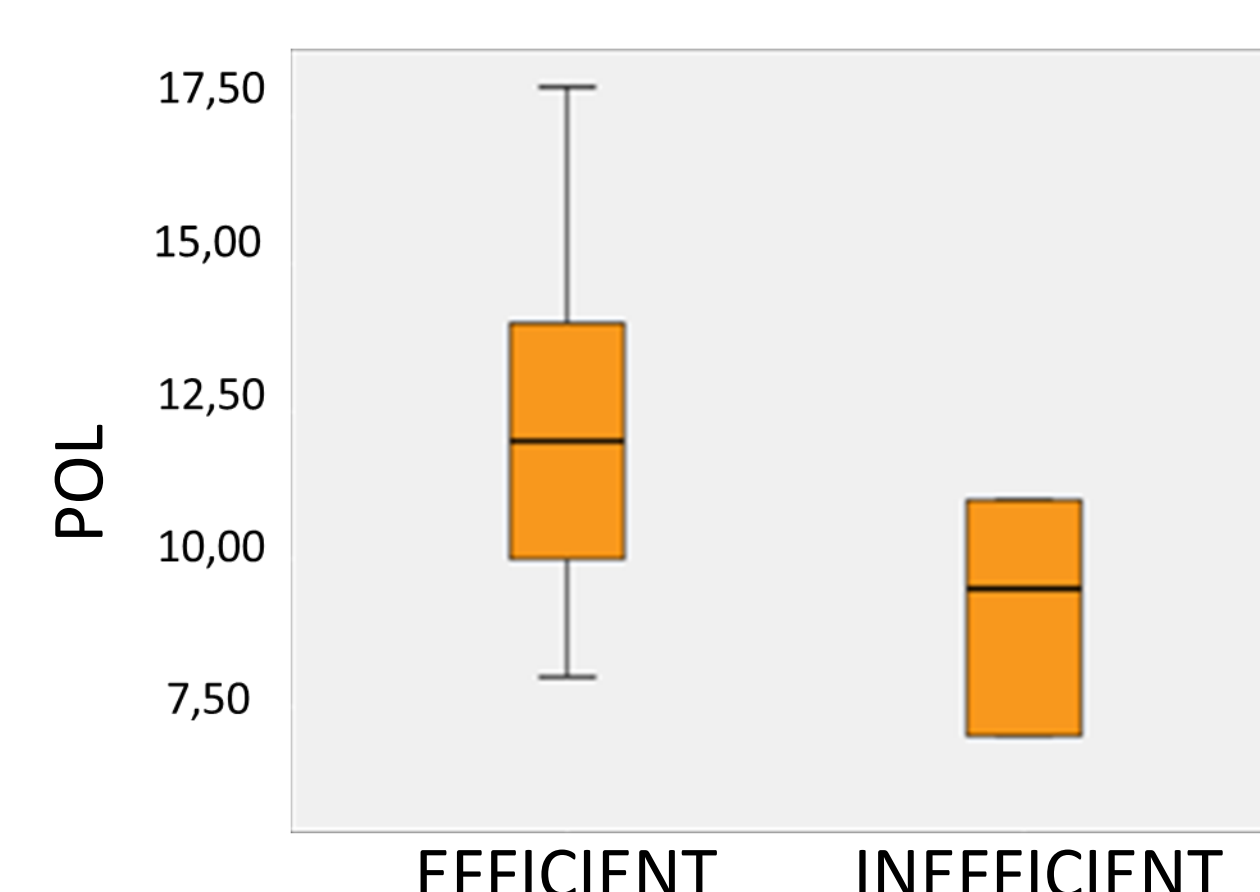


Fig.5: POL distribution in relation to efficiency score

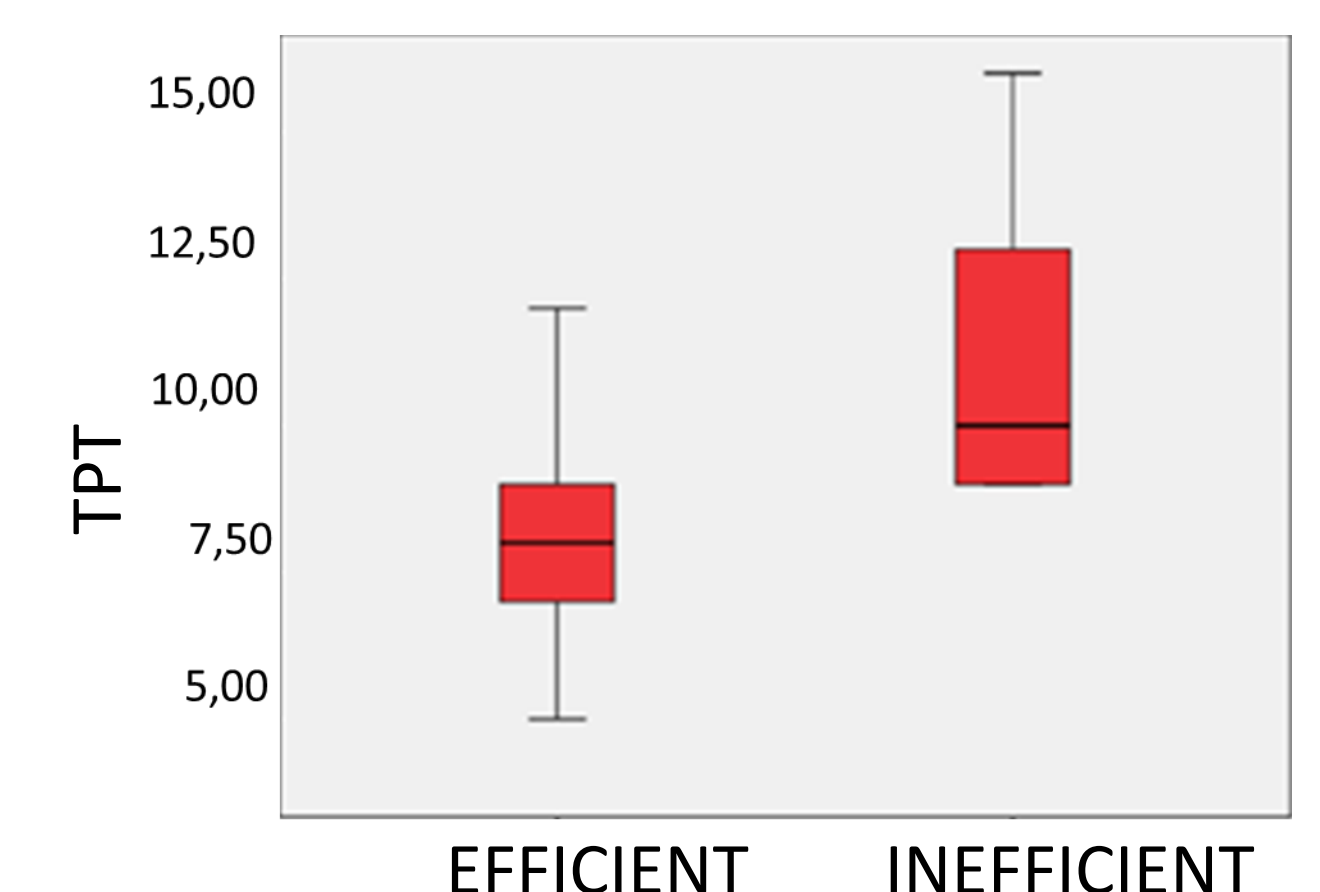


Fig.6: TPT distribution in relation to efficiency score

CONCLUSIONS

Moderate degree of pharyngeal retention and defective laryngeal closure represent two possible causes of aspiration in this sample. Pharyngeal retention is associated with pharyngeal transit time, hyoid elevation, amplitude of PES opening and tongue base retraction.

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