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NORMAL VALUES FOR OESOPHAGEAL MOTILITY AND FUNCTION DURING MULTIPLE SWALLOWS OF LOW VS HIGH VISCOSITY LIQUID

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R Sweis,^{1,2,*} A Anggiansah,¹ T Wong,¹ M Fox^{1,3} ¹Gastroenterology, Guy's & St Thomas NHS Foundation Trust, London, UK; ²Nutritional Sciences, King's College London, London, UK; ³Nottingham Digestive Diseases Centre, Queen's Medical Centre, Nottingham, UK

Introduction High resolution manometry (HRM) with spatiotemporal presentation of pressure data provides a detailed representation of oesophageal anatomy, motility and function. In the pharynx, raised Intrabolus pressure (IBP) with a steep intrabolus pressure gradient on HRM identifies clinically significant resistance to flow in the region of the upper oesophageal sphincter. The same principle can be applied to identify pathology that obstructs bolus passage also in the oesophagus and lower oesophageal sphincter (LOS); however larger volumes are required due to the greater capacity of the distal oesophagus. The sensitivity of this test to detect pathology may be increased by ingestion of high viscosity fluids compared

to water; however normal values for these tests have not been established. The aim of this study was to compare oesophageal function with 200 ml high viscosity versus low viscosity liquid swallows in the physiologic, upright seated, position.

Methods 9 healthy subjects (Male:Female 5:4, age 20–44) underwent HRM using a 36 channel solid state assembly (Manoscan 360, Sierra Scientific Instruments). After standard 10×5 ml water swallows, 200 ml of water (viscosity 1 cPois) and 200 ml of a thick lactose-free fruit-smoothie (100 kcal, ~100 cPois) were ingested in consecutive order. Volunteers were asked to drink the liquid through a straw without stopping. Spatiotemporal plots of 5 ml water and large volume multiple swallows were assessed. Results are presented as Median (IQR). χ^2 test was used for qualitative analysis and Wilcoxon test was used for non-parametric quantitative group comparisons.

Results A similar number of swallows were required to drink the high and low viscosity liquid (19.9 vs 17.9; $p=0.4$); however the duration required to ingest the smoothie was greater (35 s (33–49 s) vs 25 s (22–30 s; $p=0.018$). Complete suppression of oesophageal contractility was achieved for all water and 7/9 fruit-smoothie swallows. IBP was somewhat higher for 5 ml water swallows (8.9 mm Hg (6.7–13.8 mm Hg)) compared to 200 ml water (3.6 mm Hg (2.5–4.6)) and 200 ml smoothie (3.0 mm Hg (0.0–4.4 mm Hg)), although this difference was non-significant ($p=0.109$ and 0.139 respectively). A powerful post-contraction was observed in most patients after drinking the smoothie and water (8 vs 5/9 patients; $p=0.294$) followed by an increase in LOS postcontraction pressure (12.7 vs 7.1 mm Hg; $p=0.144$) respectively.

Conclusion This study compares the function of the healthy oesophagus to free drinking of low versus high viscosity fluids. Furthermore it provides reference values for future clinical studies to assess the clinical utility of including high viscosity fluids in HRM investigation of patients with oesophageal symptoms.

Competing interests RS, Grant/Research Support from Given Imaging and Reckitt Benckiser; AA, None declared; TW, Grant/Research Support from Given Imaging; MF, Grant/Research Support from Given Imaging, AstraZeneca, Movetis, Consultant for Reckitt Benckiser.

Keywords high resolution manometry.