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A VALSALVOMETER CAN BE EFFECTIVE IN STANDARDISING THE VALSALVA MANOEUVRE

Hypothesis / aims of study

Previous studies have shown that there is a substantial variation in the intra-abdominal pressures generated during the valsalva manoeuvre [1]. This is an important observation because many research investigations use the valsalva manoeuvre to assess other parameters such as bladder neck mobility and degree of pelvic organ prolapse. The potential to reduce the variation in intra-abdominal pressure between subjects has been established by a pilot study using a simple flow tube device modified by a valve release mechanism [1]. This device has been termed a valsalvometer.

The aim of this study was to assess the potential of a modified valsalvometer to reduce the variation in intra-abdominal pressures generated by individuals in an attempt to standardise the manoeuvre.

Study design, materials and methods

The research was carried out within a tertiary referral urogynaecology centre in the United Kingdom. The study population was 100 women who were undergoing routine urodynamic assessment for lower urinary tract symptoms. Ethical approval was obtained from the hospital ethics committee.

During urodynamic studies each patient was given an identical verbal request to produce abdominal straining and achieve a valsalva manoeuvre. This request was repeated three times. The rise in intra-abdominal pressure was measured on each occasion using an air filled balloon within the rectum.

The experiment was repeated in the same way using a modified valsalvometer. This device was constructed using an airflow restriction tube and a pressure transducer. A loud beeping sound was emitted when the pressure reached a preset level. Each patient was given a set of standard verbal instructions to blow forcefully into the device to achieve a rise in abdominal pressure. Pressure measurements were again recorded using a rectal balloon. The order in which patients underwent assessment with verbal instruction and valsalvometer device was randomised by computer.

Results

No order effect was identified. For this reason, the results of those patients who had the verbal instruction first were combined with those who had it second (and there was a similar combining of results for the valsalvometer measurements).

The table shows that each patient generates similar abdominal pressures for each of the three attempts at straining, i.e. there is little intra-individual variability (paired t-test $p < 0.05$). This occurs for both standard verbal instruction and valsalvometer.

The pressures achieved by the valsalvometer (in its present configuration) are lower than those achieved by verbal command

The use of the valsalvometer was associated with a reduction in standard deviation of approximately 50% when compared with standard verbal instruction. Even taking into account the lower pressures achieved with the valsalvometer, there is still a reduction in the variability of the pressures achieved.

verbal / valsalvometer	mean intra-abdominal pressure cmH_2O	standard deviation
verbal 1	53	29.3
verbal 2	54	28.6
verbal 3	54	31.7
valsalvometer 1	31	13.3
valsalvometer 2	30	11.9
valsalvometer 3	30	13.8

Interpretation of results

This investigation shows that the use of a valsalvometer is associated with a reduction in inter-individual variability of the abdominal pressures produced during the valsalva manoeuvre.

Concluding message

The valsalva manoeuvre is used in every day clinical practice in the assessment of patients with incontinence and pelvic organ prolapse. It also forms the basis of many research investigations such as measurement of bladder neck mobility and pelvic floor imaging. The variation in pressures produced by this manoeuvre may act as a confounding variable in such research studies.

The valsalvometer device shows potential for generating a degree of standardisation of the rise in intra-abdominal pressures produced by individuals when performing the "valsalva manoeuvre".

References

1. CAN THE VALSALVA MANOEUVRE BE STANDARDISED?
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