

# AUTOMATIC DETECTION OF VOIDING PHASE ARTIFACTS

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See: Supporting  
information

## Background and aim

Quality assessment of an urodynamic study (UDS) should be conducted before the analysis of the UDS. Recent studies showed a poor quality control of the urodynamic traces included in published articles.[1,2] An automatized algorithm could be a useful tool for this quality assessment.

We present a basic quality assessment algorithm for assessing the quality of the UDS in the voiding phase, based on the checks presented in the new ICS-SUFU standard for pressure-flow studies.

[1]: Aiello et al. Quality control of uroflowmetry and urodynamic data from two large multicenter studies of male lower urinary tract symptoms. *Neurourol Urodyn*. 2020 Apr;39(4):1170-1177. doi: 10.1002/nau.24337.

[2]: Valdevenito et al. Quality control audit of urodynamic traces published in scientific articles. *Continence*. 2023(7). supplement 1. doi: 10.1016/j.cont.2023.100878



## Methods: a two step approach

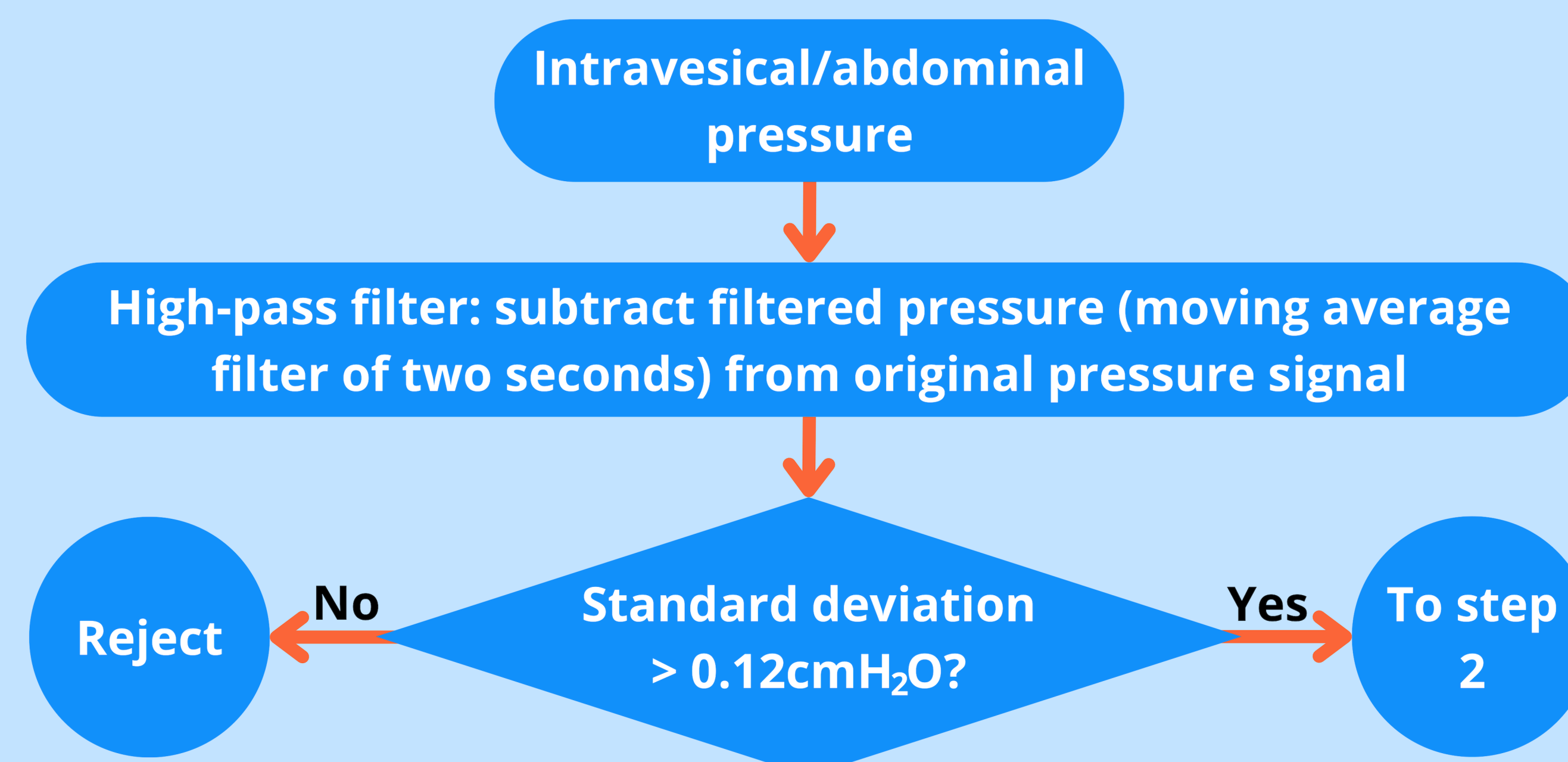
### Liveliness

As a measurement is performed in vivo, a minimal amount of signal noise or 'liveliness' is expected in both the intravesical as well as the abdominal pressure. This 'liveliness' is the result of breathing, talking and movement of the patient. Reduction of the liveliness indicates an inadequate signal transmission. The liveliness can be expressed by assessing the high-frequency variations in the signal.

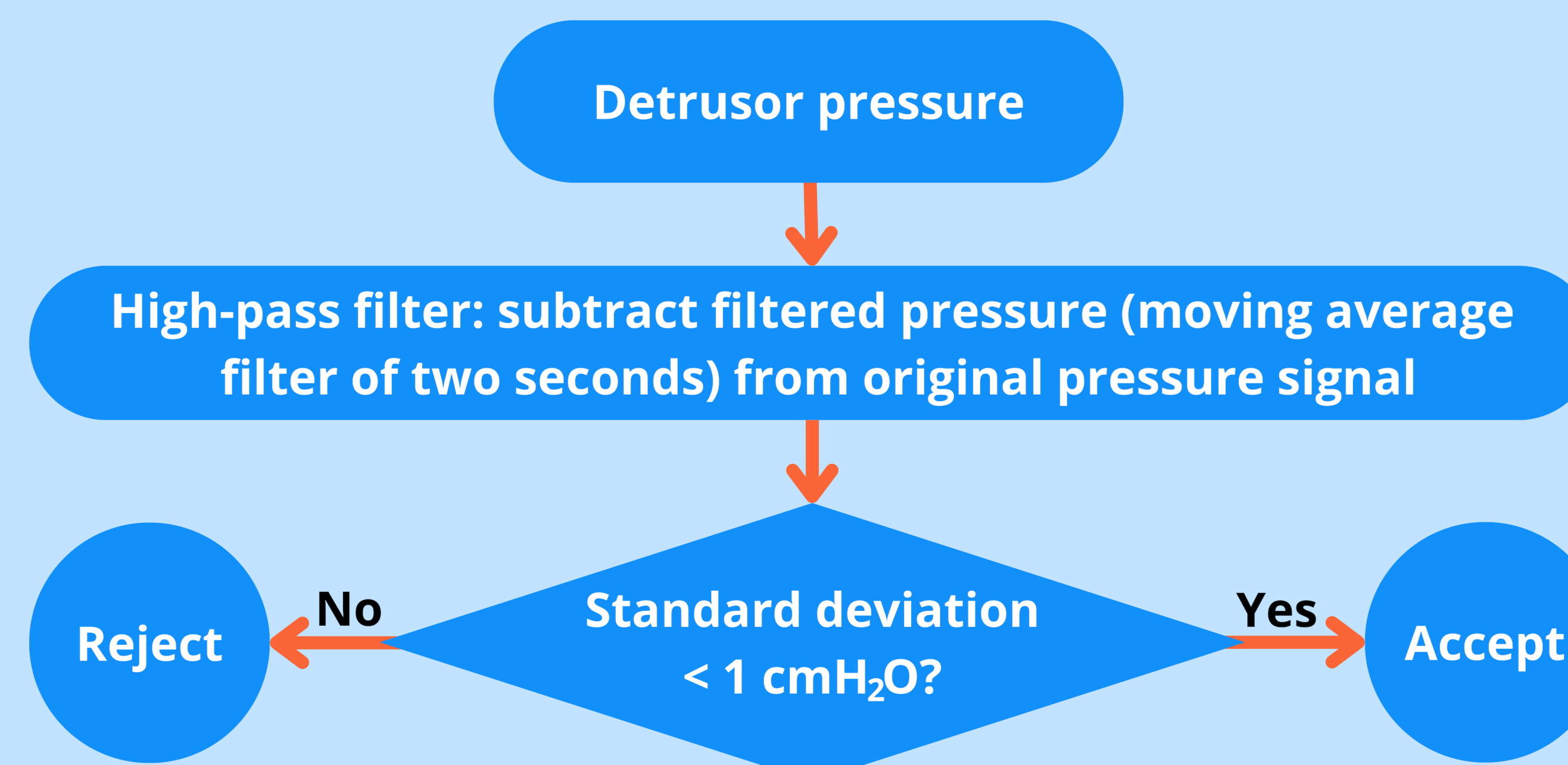
### Pressure balance

The 'liveliness' as found in the intravesical and abdominal pressures should be reduced or absent in the calculated detrusor pressure, as the strength of this 'liveliness' should be equal in both pressure measurements. Too much 'liveliness' in the detrusor pressure indicates an imbalance of the intravesical and abdominal pressures, suggesting a lower reliability of the calculated detrusor pressure.

### Step 1: Liveliness



### Step 2: Pressure balance



## Results

Empirical observations resulted in cut-off values for step 1 of 0.12 cmH<sub>2</sub>O and step 2 of 1 cmH<sub>2</sub>O. This showed a sufficient balance of falsely rejected and falsely accepted UDS's. Alteration of the cut-off values could be performed, depending on the specific purpose of the quality assessment.

## Conclusion

We presented a computer algorithm to automate the retrospective assessment of the quality of the UDS during voiding. Filling phase artifacts are likely also detectable with this algorithm.