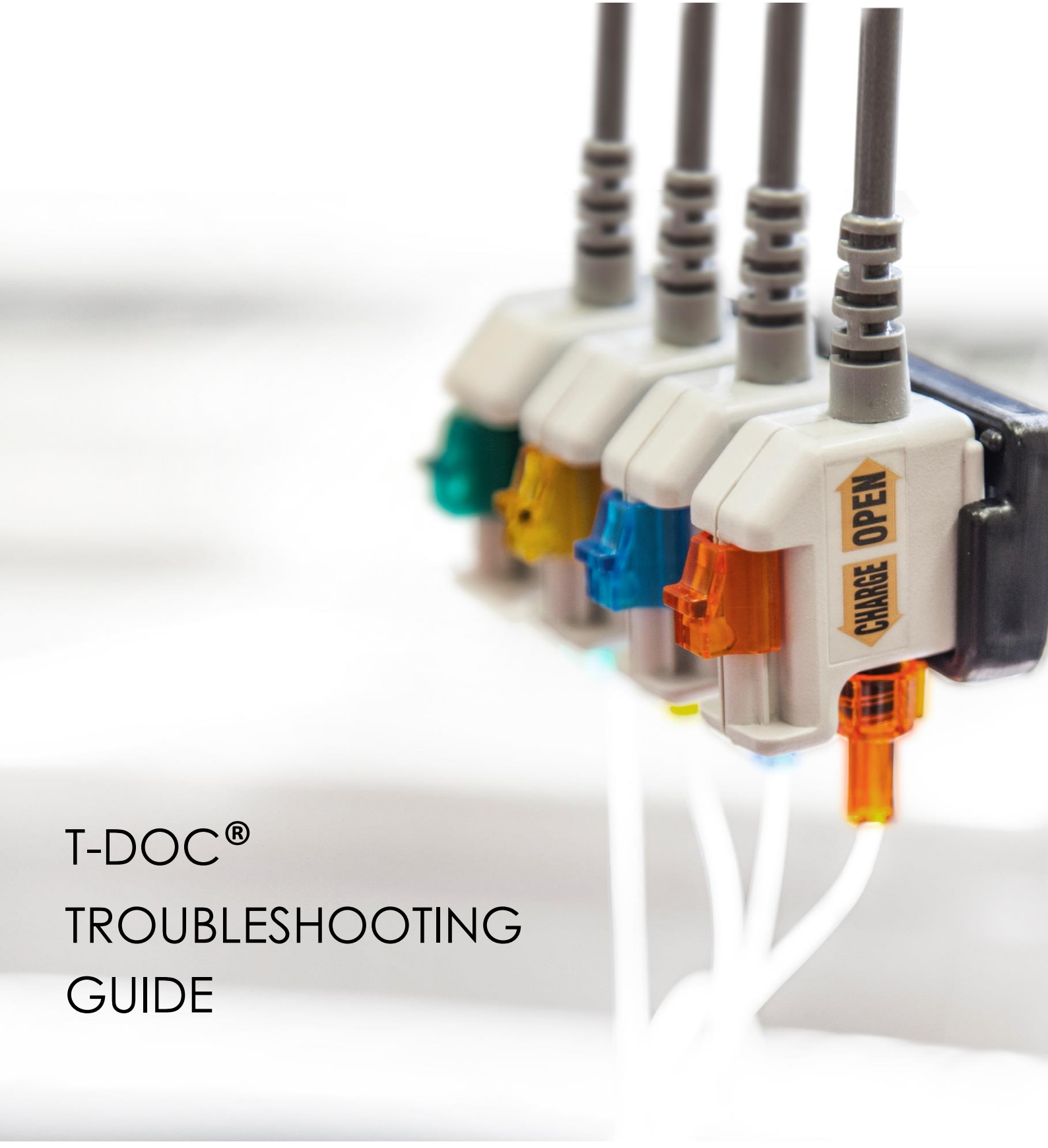


T-DOC®
TROUBLESHOOTING GUIDE

UDS – T-DOC® TROUBLESHOOTING GUIDE

PURPOSE

To identify and troubleshoot issues during a urodynamic (UDS) study, specifically focusing on T-DOC Air-Charged Catheters, to ensure accurate signal transmission.

CATHETER PLACEMENT

It is important to properly place the catheters before beginning the investigation. See below for some tips:

Vesical Catheter:

FEMALES: Insert catheter 8-10 cm for single-sensor, 12-14 cm for dual-sensor.

MALES: Insert catheter 8 cm plus length of penis. Do not force if resistance is met.

As an extra measure to ensure the catheter is in the correct position, after charging the catheter within the patient's bladder, the catheter can be adjusted by slowly pulling it back until Pves rises (indicating the catheter has hit the urethra or internal urethral sphincter). After the pressure rises, slowly advance the catheter approximately 3-5 cm back into the bladder to ensure consistant and correct placement around the level of pubic symphysis and tape securely in place.

For continuous urethral monitoring during the filling phase of a CMG, pull back charged dual catheter until urethral sensor is in the highest zone of urethral pressure and tape in place (maximum pressure point of UPP). The Pves sensor will be 6 cm away from the urethral sensor within the bladder, around the level of the pubic symphysis.

Abdominal Catheter:

FEMALES: *Rectal Placement:* Insert the catheter into the rectum 10-15 cm past any stool that may be present. While advancing the catheter, attempt to stay on the anterior wall directly under the posterior wall of the vagina. Place your finger in the vagina to aid advancement of the catheter, particularly in those patients with prolapse and rectocele.

Vaginal Placement: Insert catheter in the posterior fornix, just behind the cervix, at the level of the cul-de-sac of Douglas (8-10 cm).

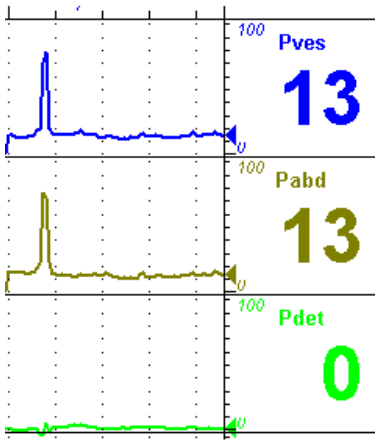
MALES: Insert the catheter above the prostate, 10-15 cm up the rectal region, preferably along the anterior wall of the rectum.

The stylet within the abdominal catheter can be bent to 90 degrees above the 15 cm mark. This allows for easy visualization of the proper depth of placement and detection of any movement of the catheter between the patient's legs. It also offers a spring action to maintain catheter placement after taping. **Bending does not effect pressure readings.**

For proper flow through the infusion line of the vesicle catheter, ensure the tubing is not kinked, especially close to the junction where it splits from the catheter. When attaching the pressure lines to the transducers, turn the transducers, not the catheters.

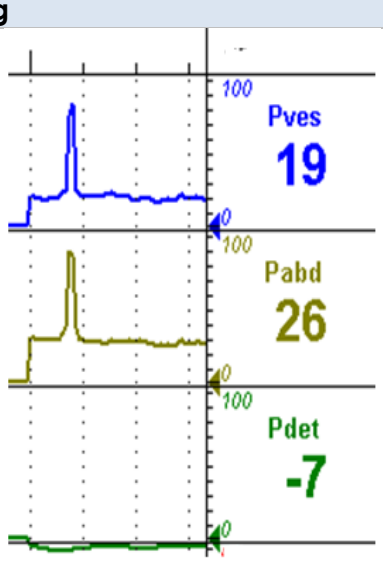
SET-UP PHASE (COUGHS)

Before beginning the investigation, a proper cough subtraction should be done and observed as shown below.

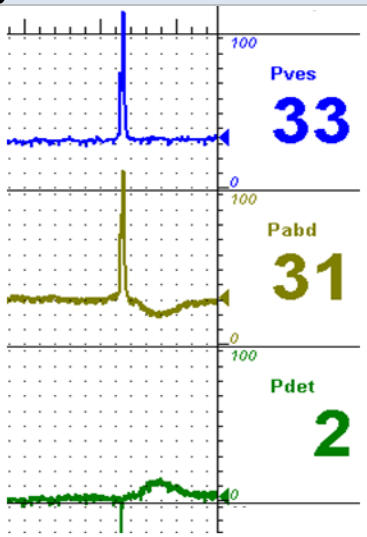
Tracing	Finding
	1. Good cough response, Pves=Pabd, Pdet=0
	Solution
	1. Start investigation

If you do not observe the above conditions, use the following steps to determine the potential problem:

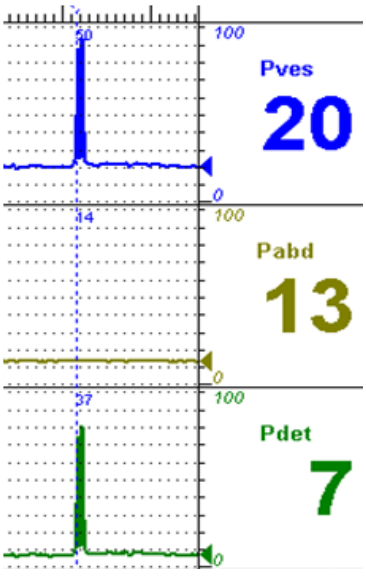
Example #1. Baseline Pabd ≠ Pves

Tracing	Potential Cause
	1. Catheter may not be in the correct place. Should be on the anterior wall of the rectum in cul de sac of Douglas
	Solution
	1. Check catheter placement (abdominal catheter first) and adjust as necessary by pulling the catheter back and forth about 1-2 cm to create pocket in stool 2. If that does not work, ask the patient to cough. If there is if there is equal transmission of cough to bladder and rectal reading as this tracing demonstrates, equalize Pabd to Pves.

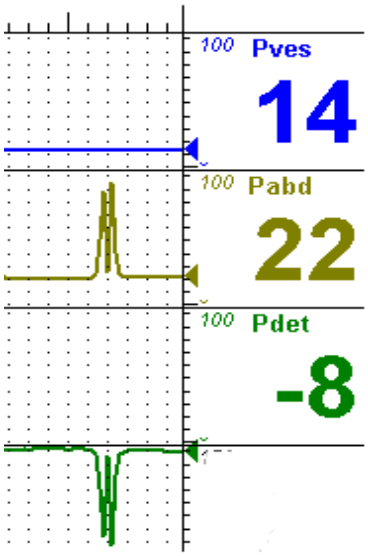
Example #2. Pabd decrease after the cough

Tracing	Potential Cause
	1. Pabd sensor may be too close to the rectal sphincter or in an gas pocket
	Solution
	1. Gently advance the abdominal catheter inside the rectum 2. Ensure catheter is taped securely in place as close to the insertion spot as possible

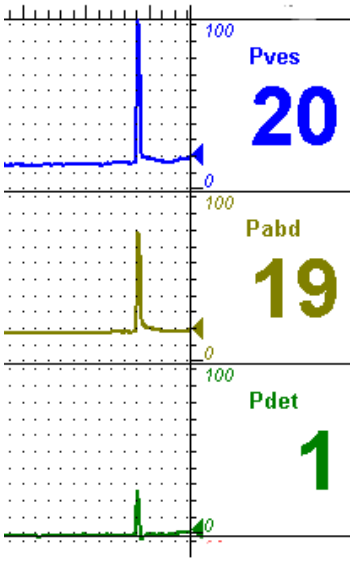
Example #3. No Pabd cough spike

Tracing	Potential Cause
	1. The Pabd Transducer cable may be in the **OPEN** position 2. Catheter not tightened enough and air has escaped from luer lock 3. Abdominal catheter may not be in the correct place 4. Equipment may require calibration 5. Hardware / cable or catheter may be faulty
	Solution
	1. Ensure the Pabd Transducer cable is set to the **CHARGE** position 2. Tighten luer lock of catheter and recharge, if necessary 3. Check catheter placement and adjust as necessary 4. Replace with new catheter and try again 5. Calibrate equipment as per instructions for use 6. Contact LABORIE Service to send back faulty catheter or for help with calibration or detection of faulty cable

Example #4. No Pves cough spike

Tracing	Potential Cause
	1. The Pves Transducer cable may be in the **OPEN** position 2. Catheter not tightened enough and air has escaped from luer lock 3. Catheter may not be in the correct place 4. Equipment may require calibration 5. Hardware / cable or catheter may be faulty
	Solution
	1. Ensure the Pves Transducer cable is set to the **CHARGE** position 2. Tighten catheter and recharge, if necessary 3. Check catheter placement and adjust as necessary 4. Replace catheter and try again 5. Calibrate equipment as per instructions for use, *OR* 6. Contact LABORIE Service to send back faulty catheter or for help with calibration or detection of faulty cable

Example #5. Pves/Pabd Cough spikes at different heights

Tracing	Potential Cause
	1. Either catheter may not be in correct position: Vesicle catheter may be in urethra or up against bladder wall or Pabd maybe in stool 2. Pabd may need to be tightened and recharged 3. If Pves is lower than Pabd, the patient's bladder may be too empty 4. Equipment may require calibration
	Solution
	1. Check catheter placement and adjust as necessary 2. Adjust Pabd in and out to make pocket in stool 3. Padb luer lock may need to be tightened and recharged 4. If Pves is lower than Pabd, start filling the bladder and re-check cough at 30 ml 5. Replace catheter and try again 6. Calibrate equipment as per instructions for use

SET-UP PHASE (RESTING PRESSURES)

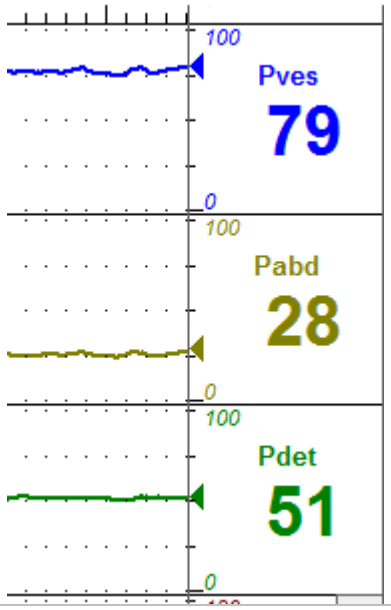
Before starting the investigation, the patients resting pressures should be within the following range:

Pves/Pabd Supine 5-20 cmH_2O
Pves/Pabd Sitting 15-40 cmH_2O
Pves/Pabd Standing 30-50 cmH_2O[1]
Pdet +/- 5 cm H2O

If the above ranges are not observed, try solving the problem with the below solutions

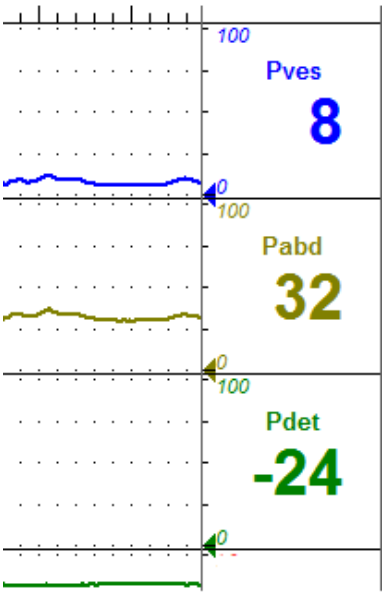
1. *Schäfer W, Abrams P, Liao L, et al. Good urodynamic practices: uroflowmetry, filling cystometry, and pressure-flow studies. Neurourol Urodyn. 2002;21(3):261-274*

Example #6. Resting Pves is too high

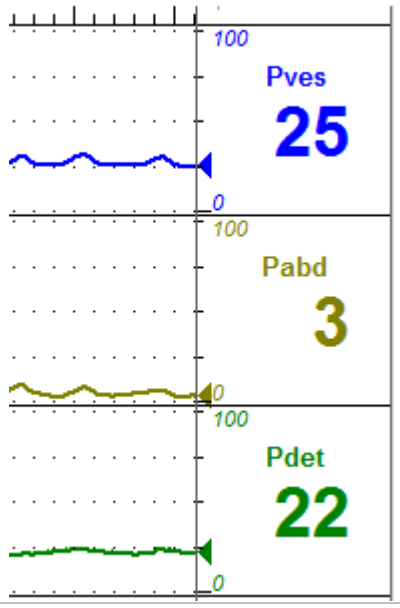
Tracing	Potential Cause
	1. Catheter may be in the urethra or resting against the bladder wall 2. Catheter may be overcharged **Solution** 1. Gently advance and/or twist the catheter and move it away from the urethra/bladder wall 2. Slide transducers to **OPEN**, ask patient to cough several times, slide transducer to **CHARGE** 3. Ask the patient to cough to ensure equal transmission of pressure

***** If pressure is extremely high (above 200 cmH2O), internal lumen may be blocked with liquid or have a manufacturing defect. Replace catheter and try again. Contact LABORIE Service to send back faulty catheter.

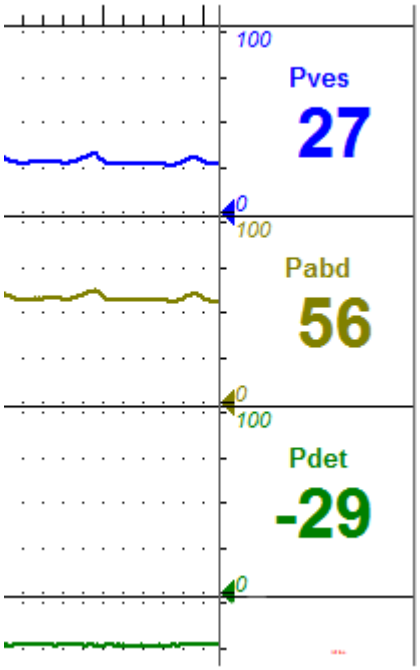
Example #7. Resting Pves is too low

Tracing	Potential Cause
	1. There may be a leak in the connection **Solution** 1. Tighten the connections between the Transducer cable and catheter and open and recharge 2. If there is an equal transmission of cough to bladder and rectal reading, equalize Pabd to Pves

Example #8. Resting Pabd is too low

Tracing	Potential Cause
	1. There may be a leak in the connection **Solution** 1. Tighten the connections between the Transducer cable and catheter and open and recharge 2. If there is an equal transmission of cough to bladder and rectal reading, equalize Pabd to Pves

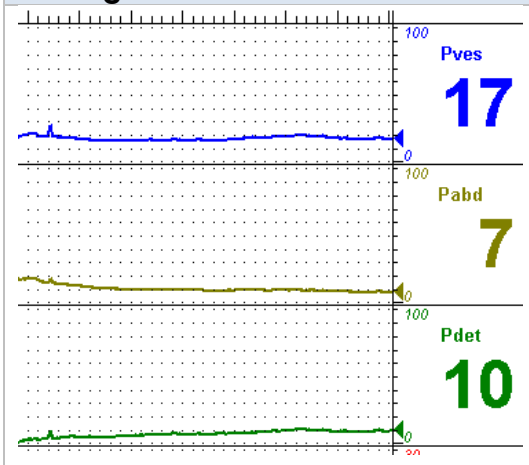
Example #9. Resting Pabd is too high

Tracing	Potential Cause
	1. Catheter may be against rectal wall/feces or in rectal sphincter 2. Patient may be experiencing a rectal vault contraction 3. Catheter may be overcharged **Solution** 1. Gently advance and/or twist the catheter and move it away from the rectal wall 2. Pause investigation (stop pump) and wait for contractions to subside, adjust catheter in and out or bring back to 10 cm to decrease parastalsis 3. Slide transducers to **OPEN**, ask patient to cough several times, slide transducer to **CHARGE** 4. If there is an equal transmission of cough to bladder and rectal reading, equalize Pabd to Pves

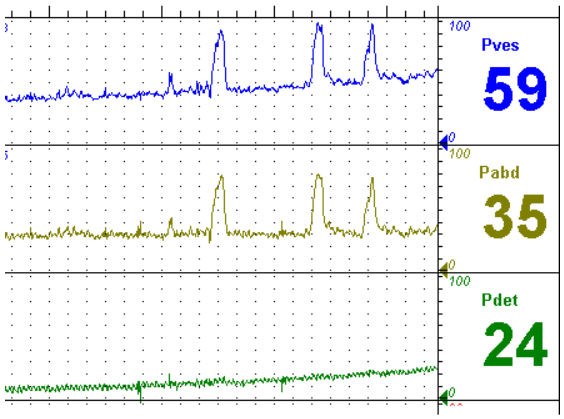
DURING THE STUDY

During the investigation, some issues can occur. Use the charts below to address some common observations:

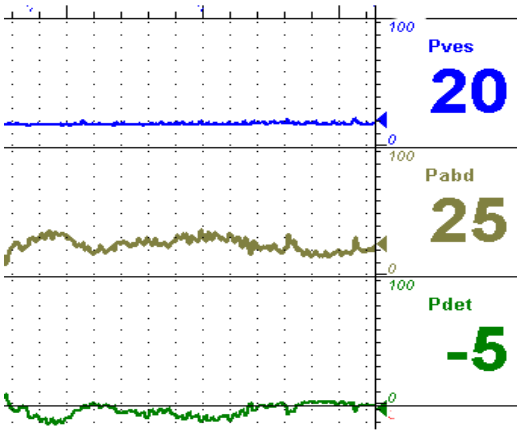
Example #10. Pabd line slowly decreases, Pves stable

Tracing	Potential Cause
	1. The abdominal catheter may have slid downwards 2. Patient may have been tense and is now relaxing
	Solution
	1. Check catheter placement and adjust as necessary 2. If Pves has not changed since the start of the test and there is equal transmission of a cough, equalize Pabd = Pves

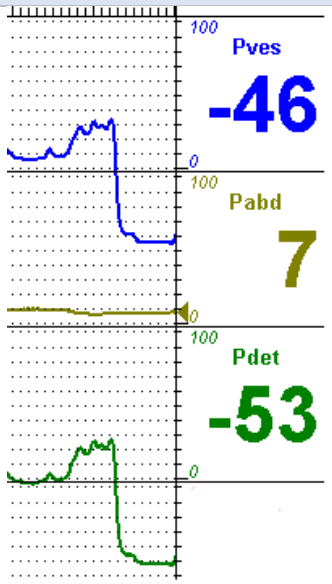
Example #11. Pves increases during filling, Pabd is stable

Tracing	Potential Cause
	1. Pves may have moved 2. Patient may have a low compliance bladder
	Solution
	1. Check catheter placement and adjust as necessary, *OR* 2. Patient related – Not applicable to troubleshooting

Example #12. Pabd constantly changing, stable Pves

Tracing	Potential Cause
	1. Abdominal catheter may be in the wrong location, *OR* 2. Patient may be experiencing a rectal contraction / parastalsis.
	Solution
	1. Check catheter placement and adjust as necessary: If rectal catheter set to 15 cm pulled back to 10 cm mark for less parastalsis *OR* 2. Pause investigation (stop pump) and wait for contractions to subside

Example #13. Pves or Pabd drops

Tracing	Potential Cause
	1. Catheter(s) may have fallen out
	Solution
	1. Check catheter placement 2. Reinsert into the bladder and check equal transmission across all pressure lines with a cough

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