VitaScan LT
Bladder Scanner

Vitacon Confidential – April 2012
VitaScan LT

- An ultrasound probe
- In a carrying case
- Connects to any PC*
- Result easily stored, shared or printed
- Optional cart
- Calibration on-line

*meeting requirements, see suggestions
A versatile solution

• The VitaScan LT can be used with a large choice of control units
  1. A lightweight slate
  2. A 10’ netbook
  3. A medical grade tablet or panel PC
  4. Your current laptop/PC
  5. Your current urodynamic system PC
Real Time Ultrasound benefits

- You can see where the probe is aiming
- You make sure the entire bladder is inside the ultrasound cone.
- One single scan should be enough for an accurate measurement

The VitaScan Real-Time ultrasound image shown during a Pre-Scan
Advantages:

• Real-Time PreScan for a better visualization of the organs:
  – During the PreScan phase

• Automatic measurement in 12 planes:
  – No need for sonographic skills

• Image can be stored with the volume measurement
  – Making sure about what is measured…

• Affordable repair and calibration service contract
Automatic measurement

• The VitaScan measures in multiple planes and displays the result automatically.

• The default 12 planes setting should be enough.
Automatic measurement

• Some Bladder scanners are not really automatic

• In a video, from a competitor, you see:
  – The measurement can be made from one single plane
  – The operator must press the « Sagittal Scan » button to add a 2\(^{nd}\) plane
  – A stylus is to be used to draw the bladder edge
Two echographic images benefit

- The result screen includes 2 images (=2 planes)
- It may allow to code the exam as an echography
How to perform a successful measurement with the VitaScan LT and other tips.
Probe positioning

Positioning the probe is key for a good measurement. The purpose of this presentation is to explain how to proceed:

1. Find the midline position on the patient’s lower abdomen
2. Palpate the pubis bone
3. Apply gel on the probe head or on the patient’s abdomen
4. Place the probe head 2-3 cm above the pubis bone on the midline
Probe positioning (Cont.)

- Press the Pre-Scan button to find the bladder.
- Angle the probe so that:
  - the green line is in the middle of the bladder shape
  - The bladder takes the largest area on the screen
- Keep this angle and press the Scan button to make the measurement
- Don’t move while the measurement is going-on.
  - Note: You know that the measurement is over when the motor is not heard and 2 images appear on the screen.
Watch the video...

Note: Internet connection required
Tips

• **Ultrasound gel quantity:**
  Too little ultrasound gel will result in a poor image. If the exam is repeated several time, you may have to put some more gel. A walnut volume is a minimum.

• **Patient’s position:**
  The patient should be in supine position, not sitting, not standing.

• **Pressure to apply:**
  A good pressure is to be applied on the probe to obtain a clear Black & White image of the bladder.

• **Validate (or reject) the measurement:**
  The operator should be able to validate or reject measurements. See the examples in the next slides for more explanations.

• **Pathologies and abnormalities:**
  Internal structures like hematoma, abdominal fluid/acids, liquids in bowel, cysts, bladder diverticula, scars may affect also the measurement. Patients with known urologic pathology may have abnormal bladders affecting the accuracy of the measurement.
Case 1: Validated measurement

• This measurement can be validated because:
  1. Both ultrasound images are showing a bladder with a closed structure.
  2. The bladder is well seen in the center of the ultrasound cone.
  3. The yellow icon is well centered inside the target.

• This measurement proved to be very accurate:
  • It reads 145 ml when the voided volume was 150 ml.
Case 2: Validated measurement for a larger bladder

As you can see the images are meeting all requirements:

1. Both ultrasound images are showing a bladder with a closed structure.
2. The bladder is well seen in the center of the ultrasound cone.
3. The yellow icon is well centered inside the target.

Compared to the voided volume, this measurement proved to be very accurate.
Case 3: Validated measurement for an empty bladder

- Many patients successfully empty their bladder completely.
- There is nothing for the VitaScan LT to capture.
- The resulting images beside are obviously not showing the bladder.
- The bladder is empty
- The VitaScan LT correctly measured a 0 ml volume.
Case 4: Validated measurement for an almost empty bladder

- In the images beside, the bladder is seen but was not detected in all planes.
- This can result in the messages “ReScan please”.
- In the case beside, the message “ReScan please” should be considered as an insignificant volume.
- In this case, the message “ReScan please” should be considered as an insignificant volume.
Case 5: Rejected measurement

- As you can see, the sagittal plane is not showing an image of the bladder with a closed shape.
- The yellow icon is not centered in the target.
- In these circumstances, the operator should reject the measurement, re-aim and rescan using a different position or angle as explained above.

- In the result below, you read 418 ml.
- It was an overestimated result compared to the voided volume.
Case 6: Rejected measurement

- As you can see both images are showing **open edges** on the upper right of the ultrasound cone (marked with yellow line and arrow).
- The yellow icon is **not well enough centered**.
- This measurement is to be **rejected**
- Re-aim and angle the probe below the pubic bone towards the patient’s lower pelvis.

- In the result screen below, the measurement was **underestimated**.
Validate or Reject measurements

**Validate when:**

1. Both ultrasound images (*in Transverse and Sagittal planes*) are showing a bladder with a closed structure.
2. The bladder is well seen in the center of the ultrasound cone.
3. The yellow icon is well centered inside the target.

**Reject when:**

1. The bladder image is not a closed structure, and/or
2. 1 or both of the images is not showing the bladder well centered, and/or
3. The Yellow icon is not well centered in the target, and/or
4. The Yellow icon has a strange shape
Data logging (NB: advanced feature)

It is possible to store automatically all the images for further investigation

- How to do this?
  - Go to the Setup menu
  - Enter the password 1234
  - Check the box “Enable Data Logging”
  - 2 types of files are stored in 2 directories:
    - Bitmap (*.bmp) files showing each planes.
    - A proprietary format (*.bmvi) used to playback the measurement
  - NB: Directory location: C:\Program Files (x86)\VitaScanLT\INSTALL\LOG

- Warning:
  - Data Logging should not be enabled by default.
  - Each measurement will take 64 Mb of space

- If you face a difficulty, you could send us the files for evaluation
Accuracy discussion:

Why do I measure a different volume with the VitaScan LT and the beaker?

1. As you may know, the bladder is sometimes not fully emptied. Both the beaker volume and the Post-Void Residual volume must be added to make-up the VitaScan LT « full bladder » volume.

2. The medical literature (see ref. in the appendix) shows that an error is possible with a mean error going from 15 to 80 ml.

3. Yet, the authors of most studies “consider this degree of accuracy to be reasonable for routine clinical practice”, and recommend Portable Bladder Ultrasound for its quickness and convenience.

4. The reference for our accuracy statement are phantoms and are fully met.

5. VitaScan LT is able to measure Bladder volume as low as 5 ml!

6. Some medical problems may also explain the difference. An extreme case of falsely elevated postvoid residual volumes was documented by Kannayiram Alagiakrishnan (see next slide) due to renal and ovarian cystic lesions.
Medical problems affecting accuracy

- Some medical problems may also explain the difference.
- An extreme case of “falsely elevated postvoid residual volumes” was documented by K. Alagiakrishnan (see ref in the appendix) due to renal and ovarian cystic lesions.
- The article reads “Postvoid residual urine volumes, measured on several different occasions, ranged from 403 to 855 mL, with only 75 to 200 mL drained by in-and-out catheterization.”
- Which brings the author to conclude: “Any difference or discrepancy between the results of the bladder scanner and the in-and-out catheter should alert the health care professional to look for cystic and pelvic pathology, which can present as falsely high PVR volumes.”

Large renal cyst, extending from the lower pole of the left kidney toward the bladder area
Medical article references