

Urological Health in the Acute Care Setting

By Richard S. Pelman, M.D.



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BladderScan® Bladder Volume Instrument

The BladderScan® Bladder Volume Instrument from Verathon® is a portable, easy-to-use ultrasound device that measures bladder volume noninvasively. The BladderScan® provides accurate results in a manner that is safe and comfortable for the patient.

In this In-service Training section, you'll find brief guidelines for using the BladderScan®, along with a competency assessment to help you verify what you've learned.

Reasons for Implementing the BladderScan®:

- Prevent unnecessary urethral catheterization
- Reduce rates of nosocomial urinary tract infections
- Reduce the risk of hydronephrosis (upper urinary tract damage)
- Eliminate unnecessary patient trauma and discomfort, preserve patient dignity
- Save staff time

Clinical Applications:

- Measurement of post-void residual bladder volume
- Evaluation and diagnosis of urinary retention
- Determination of need to catheterize following the discontinuation of a Foley catheter or during an intermittent catheterization schedule
- Verification that a Foley catheter is draining properly
- Verification of an empty bladder
- Checking for bladder overdistention
- Monitoring patients' hydration status

Note: Your facility will provide you with the policies and procedures for using the BladderScan® with your patient population.

In-Service Training: BladderScan® Use

Follow the instructions below for the BladderScan® bladder volume instrument (BVI) model used at your facility (BVI 3000, BVI 6100, BVI 6400 or BVI 9400).

BACKGROUND:

The BladderScan® determines bladder volume noninvasively. It uses ultrasonic reflections within the patient's body to differentiate the urinary bladder from surrounding tissue and create a three dimensional ultrasound image of the bladder. Based on this image, the BladderScan® automatically calculates and displays bladder volume on an easy-to-read LCD screen.

EQUIPMENT:

- BladderScan® BVI 9400 or BVI 3000 with Probe and onboard printer, BladderScan® BVI 6100, or Mobile BladderScan® BVI 6400
- Sontac® gel pads or ultrasound transmission gel
- Tissue
- Alcohol preps

PROCEDURE FOR USING THE BLADDERSCAN® BVI 9400:

A. Prepare for the Exam

1. Watch the BladderScan® BVI 9400 video on the instrument and read this manual before attempting to scan a patient. Before using the BladderScan®, personalize the instrument with the name of your facility and the correct date and time. This information will be shown on all printouts.
2. Turn on the BVI 9400 by pressing the On/Off button. Make sure the Probe is plugged in and the battery is adequately charged. Check to make sure there is enough paper in the printer.
3. Explain to the patient the BladderScan® procedure and the reason for measuring bladder volume.



BladderScan® BVI 9400

4. If the patient is being scanned for post void residual (PVR) determination, have the patient void 10 to 15 minutes before the test is performed.

5. Have the patient lie flat with head elevated on a pillow. During the procedure, ask the patient not to flex her/his abdomen or make any movement that could affect the results.
6. Position BladderScan® so that the screen is easily viewed. If educating the patient about bladder volume, position machine so that the patient can also view the screen.
7. Expose the lower abdomen. The bladder lies in the pelvis directly behind the symphysis pubis (pelvic bone).
8. Before using the Probe, clean the rounded end by wiping it with an isopropyl alcohol pad.

B. Scan the Patient

1. Select gender. If the female patient has not had a hysterectomy, press the FEMALE button. For all other patients (male or female), press the FEMALE button again to clear the gender icon from the LCD screen.
2. Palpate the patient's symphysis pubis (pubic bone). Place an ample quantity of gel (with as few air bubbles as possible) or a Sontac® gel pad midline on the patient's abdomen, approximately one inch (3 cm) above the symphysis pubis.
3. Standing at the patient's right side, place the Probe on the gel or gel pad and aim toward the expected location of the bladder. For most patients, this means tilting the Probe slightly toward the coccyx (tailbone) so the scan clears the pubic bone.
4. Press the SCAN button, located on the underside of the Probe. As the scan progresses, sections of the bladder will appear on the console screen. When you hear the end-scan tone, the scan is complete.

C. Verify Aim and Print Exam Results

1. If the scan is “on target” all 8 arrows will flash on the Probe screen, and the bladder will be shown in the center of the crosshairs on the Console screen. Since no re-aiming is needed, no arrows will appear on the Console screen.
2. If the scan is “off target” the Probe will show an arrow indicating the direction to move the Probe to be “on target.” If the arrow is solid, it means you are slightly “off target.” If the arrow is flashing, it means you are significantly “off target” and must re-aim and re-scan. On the Console, the bladder will not be on the crosshairs, and there will be an arrow pointing in the direction for re-aiming.
3. To re-aim, note that the small dot at “6 o'clock” on the Console target represents the feet of the patient. The “12 o'clock” position represents the head of the patient and the upper left quadrant (9-12 o'clock) represents the right shoulder of the patient. This orientation should help you in re-aiming the Probe to capture the complete bladder in the ultrasound “cone.”

4. You may also see a screen that indicates the pubic bone is “inside” the ultrasound cone. If this occurs, you may want to re-aim and re-scan. Although the bladder may be shown as centered in the ultrasound cone, and your measurement could be complete, there is a possibility that the pubic bone is obscuring some of the bladder. By re-aiming, you can ensure you have captured the bladder fully inside the ultrasound cone.
5. To save the exam, you must annotate it. To annotate, press and release the RECORD button on the Console. When you see the RECORD button icon turn to a STOP button icon, record your patient information by speaking into the Probe microphone. Press the STOP button on the Console. When the hourglass icon disappears, press the LISTEN button to replay the annotation. To review the images of your scan, press the REVIEW button (you must first save the exam before you can review it).
6. To print exam results via on-board printer, press the PRINT button. To perform another exam, press the HOME button. Finish exam.
7. Once you have completed the scan, remove the gel pad or wipe the ultrasound gel off the patient and the Probe. For ScanPoint® subscribers, logging on to ScanPoint® automatically transfers and saves your annotated exams.

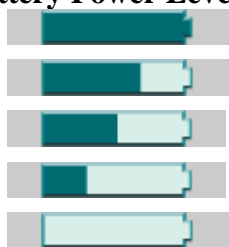
TROUBLESHOOTING

- ✓ **Instrument Does Not Turn On:** If the instrument does not turn on, this is usually due to a dead or discharged battery and can be remedied by replacing the dead battery with a charged battery. Check the battery icon in the upper right corner of the LCD display. If the battery icon does not display any power segments, replace the battery. When the battery charge is too low to allow normal operation (but not too low to permit operation of the internal circuitry) the device displays the following message:

BATTERY CHARGE LEVEL IS TOO LOW FOR INSTRUMENT OPERATION.
RECHARGE BEFORE NEXT USE.

In this case, the battery must be recharged or replaced with a charged one.

- ✓ **Battery Power Level:**



The battery is fully charged.

Partially discharged.

Between 25% and 50% charged.

Almost depleted. Can power a few more scans.

Replace immediately.

- ✓ **Printer Problems**

- ✓ **No Paper:** The BladderScan® BVI 9400 senses the presence of paper and automatically displays an “out of paper” screen when the printer is out of paper.

For instructions on loading paper, review the on-board training module or refer to the section in the User’s Manual title, Loading Paper.

- ✓ **Too Hot:** The BVI 9400 displays the message TOO HOT if the print head overheats. In this case, turn off the BVI 9400 immediately. This condition may be the result of a paper jam. To clear the paper jam, see the following paragraph.
- ✓ **Clearing A Paper Jam:** If the paper will not advance through the printer, gently pull the paper jam backward while moving the thumb wheel counterclockwise.
- ✓ **CAUTION! Possible Device Damage:** If the paper jam is inaccessible, do not try to disassemble the printer. Contact your authorized Verathon® Service Center or your local Verathon® distributor for service.

PROPER CARE AND MAINTENANCE

To Clean and Disinfect the BladderScan® BVI 9400:

- ✓ Use a soft cloth dampened with isopropyl alcohol (or an appropriate hospital cleaning agent) to wipe the Probe until it is thoroughly cleaned.
- ✓ If you use a detergent solution to clean the instrument, remove all residual detergent. Dry the instrument with a clean, soft cloth.
- ✓ If the instrument needs to be disinfected, dampen a soft cloth in any glutaraldehydebased hospital disinfectant solution such as Cidex® or Cidex 7® from Advanced Sterilization Products, or Sporocidin® from Sporocidin International. Wipe the instrument with a dampened cloth.
- ✓ To remove all traces of disinfectant solution and wipe the instrument with a clean soft cloth dampened in sterile water or cleaning solution. Verathon® recommends wiping the device three separate times to remove all residual disinfectant.
- ✓ Thoroughly dry the instrument with a clean, soft cloth before using.
 - ◆ Do not immerse the instrument in disinfectant solution.
 - ◆ Do not use CidexPlus® to disinfect the instrument. CidexPlus will damage the plastic enclosure.
 - ◆ Do not subject any part of the instrument to steam sterilization or ethylene oxide sterilization.

Regular Inspections and Maintenance:

Verathon Medical® recommends that the BVI 9400 be certified by an authorized BladderScan® Service Center once a year. Certification service includes comprehensive inspection and testing of the instrument to ensure accurate performance in clinical use. For more information, please contact your authorized BladderScan® Service Center, your local BladderScan® distributor, or Verathon Medical® Customer Care Department at 1.800.331.2313 (North America only. International customers, please refer to the contact information in the User's Manual).

PROCEDURE FOR USING THE BLADDERSCAN® BVI 3000:**A. Prepare for the Exam**

1. Watch the BladderScan® BVI 3000 training video before attempting to scan a patient. Before using the BladderScan®, personalize the instrument with the name of your facility and the correct date and time. This information will be shown on all printouts.
2. Turn on the BVI 3000 by pressing the On/Off button. Make sure the Probe is plugged in and the battery is adequately charged. Check to make sure there is enough paper in the printer.

**BladderScan® BVI 3000**

3. Explain to the patient the BladderScan® procedure and the reason for measuring bladder volume.
4. If the patient is being scanned for post-void residual (PVR) determination, have the patient void 10 to 15 minutes before the test is performed.
5. Have the patient lie flat with head elevated on a pillow. During the procedure, ask the patient not to flex her/his abdomen or make any movement that could affect the results.
6. Position BladderScan® so that the screen is easily viewed. If educating the patient about bladder volume, position machine so that the patient can also view the screen.
7. Expose the lower abdomen. The bladder lies in the pelvis directly behind the symphysis pubis (pelvic bone).
8. Before using the Probe, clean the rounded end by wiping it with an isopropyl alcohol pad.

B. Scan the Patient

1. From the BVI 3000 main menu, press the Scan button.
2. Press the gender button to select the MALE or FEMALE setting. The FEMALE option allows the BladderScan® to exclude the uterus from the measurement. Use the FEMALE option only for female patients who have not had the uterus removed (hysterectomy). For female patients who have had the uterus removed, use the MALE setting when scanning.
3. Palpate the patient's symphysis pubis (pubic bone) and apply a generous amount of transmission/conductivity gel (2 tablespoons) or a Sontac® gel pad to the patient's

abdomen (suprapubic area) over the area you are going to scan.

4. The use of ultrasound gel is very important. Smooth the gel or gel pad to remove any air bubbles, which may block ultrasound transmission. When using conventional ultrasound transmission gel for very thin or obese patients, more gel is required. If a patient has a large amount of hair on the area being scanned, then more gel is also needed. If you scan with a dry Probe, you will get inaccurate readings. Gel pad use is highly recommended.
5. Position the Probe about 1.5 inches (or 4 cm) above the symphysis pubis/pelvic bone (bladder or suprapubic area), applying light pressure on the Probe to ensure good contact with the patient's skin.
6. The Probe must be aligned properly in order for the aiming screen to work. Locate the "stick figure" icon on the side of the Probe and line it up with the patient's body, so the head of the stick figure points in the same direction as the head of the patient, and the feet of the stick figure point toward the feet of the patient.

Note: If a scar is present on the area being scanned, scan to the side, above, or below scar tissue. The same applies for bandages.

7. Press and release the SCAN button on the Probe. (You do not need to hold the scan button in during the scan.)
8. Hold the Probe steady during the scan. Moving or rolling the Probe while the scan is taking place will cause an inaccurate reading. It is recommended that you look at the Probe during the scan. An image cannot be seen until the scan is complete. You will hear a beep when the scan is finished.

C. Verify Aim and Print Exam Results

1. The Aiming screen displays a cross-section of the bladder, as viewed when looking down into the patient's abdomen:
2. If the light-colored bladder image is not centered on the target-shaped aiming icon and the LCD screen shows a "greater than" (>) symbol next to the bladder volume, then the bladder was not within full view of the Probe and the volume is higher than what is displayed. Recheck the Probe for correct position and scan again.
3. Use the image on the aiming icon to guide you when you re-aim: For example, if the bladder image is located toward the left side of the aiming icon, then re-aim the Probe so it projects ultrasound waves further to the left.

Note: If the volume shown is greater than 999, then you have the bladder in full range and can print out an accurate reading.

4. When you are satisfied that the measurement is correct, press the DONE button. The scan results will be displayed.
5. When you are ready to print out an accurate scan, press the print button twice to start the printing process.
6. Once you have completed the scan, wipe the gel off the Probe and the patient.

TROUBLESHOOTING

- ✓ **“NO PROBE” is displayed:** No Probe or an incorrect Probe is installed.
- ✓ **“Battery charge level is too low for instrument operation. Recharge before next use.”:** Battery power is too low, recharge unit.
- ✓ **Paper jam:** Lower the print head, release lever located adjacent to the paper advance thumb wheel. Gently pull the paper either forward or backward to clear the paper jam.
- ✓ **Battery appears dead:** Check the battery icon in the upper-right corner of the console’s LCD screen. If the battery icon is not darkened, replace the battery with a freshly charged one to see if that solves the problem.
- ✓ **Scanner reading “0”:** Apply more ultrasound gel to Probe and rescan.

PROPER CARE AND MAINTENANCE

- ✓ The machine and Probe may be cleaned with a soft cloth dampened in isopropyl alcohol or any standard hospital cleaning solution that does not contain aromatic hydrocarbons.
- ✓ Always inspect the Probe for cracks.
- ✓ Keep the instrument and Probe on the rolling cart to prevent damage to the instrument.

PROCEDURE FOR USING THE BLADDERSCAN® BVI 6100 AND BVI 6400**A. Prepare for the Exam**

1. Watch the BladderScan® BVI 6100 training video before attempting to scan a patient.

Note: The BVI 6400 (“Mobile BladderScan®”) can store 10 or more voice-annotated exams. For instructions on saving multiple exams, consult the documentation that came with your BVI 6400 scanner. The procedure for performing a single scan with the BVI 6400 is the same as the procedure for scanning with the BVI 6100.

2. If the scanning instrument is in sleep mode, turn it on by pressing any button. Check the battery icon to make sure the scanning instrument is sufficiently charged for patient exams.
3. Explain to the patient the procedure and the reason for measuring bladder volume.
4. If the patient is being scanned for post-void residual (PVR) determination, have the patient void 10 to 15 minutes before the test is performed.
5. Have the patient lie flat with head elevated on a pillow. Ask the patient not to flex her/his abdomen during the procedure or make any other movement that could affect the results.
6. Expose the lower abdomen. The bladder lies in the pelvis directly behind the symphysis pubis (pelvic bone or suprapubic area).
7. Before using the Probe unit, clean the rounded end by wiping it with an isopropyl alcohol pad.

**BladderScan® BVI 6100****Mobile BladderScan® BVI 6400**

B. Scan the Patient

1. Palpate the patient's symphysis pubis (pubic bone).
2. Apply a Sontac® gel pad or ultrasound gel to the abdomen over the area you are going to scan (approximately 1.5 inches/ 4 cm above the symphysis pubis). Smooth the gel pad to remove any air bubbles trapped beneath, which may interfere with ultrasound transmission.

Note: If you scan with a dry Probe, you will get inaccurate readings.

3. Use the Gender (Top) button to select the female option for female patients who have not had the uterus removed (hysterectomy). When the female option is selected, a female icon appears on the LCD screen. The female option excludes the uterus from the measurement. For all other patients, use the Gender (Top) button to toggle between options until no icon is displayed.
4. Place the Probe on top of the gel or gel pad, applying light pressure to insure contact with the patient.

Note: You may need to scan around scar tissue on some patients. Scan to the side, above, or below scar tissue on these patients. The same applies for bandages.

5. Press and release the Scan button, located on the underside of the Probe's handgrip.

Hold the Probe steady during the scan. Moving or rolling the Probe while the scan is taking place will cause an inaccurate reading. When the scan is complete, the instrument beeps and displays a measurement.

C. Verify Aim

1. If flashing aiming arrows appear below the bladder volume measurement, then the Probe was not aimed properly and part of the bladder was outside of its field of vision. Re-aim the Probe in the direction indicated by the flashing arrow and scan again. Repeat until a solid arrow or no arrow appears, indicating that you have achieved an accurate measurement.

Note: A solid aiming arrow indicates an aiming suggestion. Solid arrows appear when the instrument senses that the bladder was contained but not completely centered in its field of vision. You may re-aim if you wish, but this is not required.

2. Chart the measurement or use ScanPoint® to save and print the exam result from your personal computer.
3. When you have completed the scan, throw away the Sontac® gel pad or wipe the ultrasound gel off the Probe and the patient. Place the instrument in its cradle when not in use.

TROUBLESHOOTING

- ✓ **Scanning instrument does not turn on:** Usually due to a dead or discharged battery. Place the scanning instrument in its cradle and charge for a minimum of fifteen minutes. Then use the activation stylus to press the reset button, located above the scan button. After fifteen minutes, sufficient power will be restored to perform a patient exam; however, fully charging the battery may take up to six hours.
- ✓ **Scanning instrument is charged but will not scan:** Either (a) the battery has some power remaining, but not enough to perform patient exams, or (b) you need to calibrate the scanning instrument. If (a), place the instrument in its cradle to recharge the battery. If (b), use ScanPoint® to calibrate your instrument. To display the number of days remaining until your instrument requires calibration, press and hold down the Gender button for five seconds.
- ✓ **A flashing arrow appears below the bladder volume measurement:** The scanning instrument was not properly aimed and part of the bladder is outside its field of vision. Re-aim the scanning instrument so it projects ultrasound waves in the direction indicated by the arrow, and scan again.
- ✓ **A solid arrow appears below the bladder volume measurement:** The solid arrow indicates an aiming suggestion. Solid arrows appear when the scanning instrument senses that the bladder was not completely centered in its field of vision. In this case, you may re-aim if desired, but this is not necessary. For patients with oblong or extremely large bladders, a solid arrow often accompanies a good measurement.
- ✓ **A greater than (>) symbol appears beside the bladder volume measurement:** The greater than symbol indicates that the bladder is too large to fit in the scanning instrument's field of vision and the true bladder volume is larger than displayed. In such cases, re-aiming the scanning instrument won't help; however, this situation occurs almost exclusively in patients with extremely high bladder volumes, and such measurements are clinically useful even though they underestimate the actual volume.

PROPER CARE AND MAINTENANCE

- ✓ Clean and disinfect the BladderScan® BVI 6100 and BVI 6400 with a soft cloth dampened in isopropyl alcohol or an appropriate hospital cleaning agent (do not use Cidex Plus).
- ✓ Once a week, you should inspect the Probe for physical faults or cracks.
- ✓ You must calibrate the scanning instrument every 6 to 12 months using ScanPoint®. For details, consult the User's Guide that came with your instrument.
- ✓ Store the scanning instrument in its cradle when not in use. This ensures that the battery is always sufficiently charged for patient exams.

Important Points to Remember:

- The BladderScan® is dependent on the user to achieve the highest level of accuracy. You may see a slight deviation in your readings, but this is normal and your results will be useful for clinical applications.
- If a female patient has had a hysterectomy, do not select the female setting, which causes the instrument to differentiate for uterine tissue.
- The application of ultrasound gel is very important. If you scan with a dry Probe, you will obtain inaccurate readings. Verathon® recommends using Sontac® gel pads to obtain the highest degree of accuracy. Sontac® gel pads also create less mess than conventional ultrasound gel and reduce clean-up time after exams.
- After you measure bladder volume, an aiming icon (either an aiming target or aiming arrows, depending on your BladderScan® model) will appear on the LCD screen. If the aiming icon indicates that the BladderScan® was not properly aimed (i.e., the bladder was not centered within the range of the Probe), re-aim and scan again as necessary.
- If the LCD screen shows a “greater than” symbol next to the bladder volume measurement, then you do not have the bladder within full range of the Probe and the patient’s true bladder volume is greater than the volume displayed on the screen. An exception occurs when the volume shown is greater than 999 cc; in this case, the bladder is within full range of the instrument and the reading displayed is accurate.
- The BladderScan® instrument automatically saves the highest volume measured, because in most scenarios the highest measurement is the most accurate. Exceptions occur when the operator moves the Probe during the scan or fails to select the female gender when applicable. In such situations, clear the scan results screen, make sure the gender setting is correct, and then re-scan the patient.
- Urinary catheters, scar tissue, sutures, incisions, surgical staples and fluid-filled cysts may all interfere with the accuracy of the BladderScan® and should be assessed on an individual basis. You may need to scan beside, above or below scar tissue on some patients if scanning the tissue directly is painful for the patient or prevents you from obtaining an accurate measurement. The same applies for bandages.
- Remember that ultrasound cannot be transmitted through bone. Make sure you are not resting the Probe on the pubic bone of your patient. If the aiming indicator shows that the Probe needs to be aligned lower on your patient’s abdomen and you are already near the bone, simply aim the Probe so it points into the pelvic cavity.

Competency Assessment for the BladderScan®

Name _____

Unit _____

Date _____

OBJECTIVE: THE USER WILL DEMONSTRATE THE ABILITY TO ACCURATELY ASSESS A PATIENT'S BLADDER VOLUME BY OBTAINING AN ULTRASOUND MEASUREMENT AND PRINTING A COPY TO ATTACH TO THIS FORM.

COMPETENCY WILL BE DEMONSTRATED BY VIEWING THE BLADDERSCAN® TRAINING VIDEO, OBTAINING AN ACCURATE BLADDER VOLUME READING, AND ACHIEVING A SCORE OF 80% OR HIGHER ON THE POST TEST.

POST TEST: MARK THE FOLLOWING STATEMENTS TRUE OR FALSE

1. _____ To ensure the highest degree of accuracy, the BladderScan® BVI 3000 instrument automatically saves the average bladder volume measurement from any series of scans.
2. _____ Moving the Probe while scanning will result in artificially high bladder volume measurements. In this case, the operator should clear the scan results and re-scan the patient.
3. _____ The female gender should be selected for all female patients, because women's bladders are shaped differently than men's.
4. _____ A greater than symbol always indicates that the bladder is too large to scan accurately. In this situation, repositioning the Probe and re-scanning the patient won't help.
5. _____ Sontac® gel pads are recommended to obtain the highest degree of accuracy.
6. _____ The bladder does not need to be centered in the scan plane (range of the Probe) for best results.
7. _____ The aiming icon on the BladderScan® LCD screen helps guide the operator to optimal Probe placement. If indicated by the aiming icon on the scan results screen, the operator should readjust the aim of the Probe and re-scan the patient to ensure maximum accuracy.
8. _____ Urinary catheters, scar tissue, incisions, sutures, surgical staples, and fluid-filled cysts may all interfere with the accuracy of the BladderScan® instrument. The BladderScan® should not be used on these patients.
9. _____ If the Probe needs to be aimed further downward, but is too close to the symphysis pubis, the operator should tilt the Probe so it points down into the pelvic cavity. This is because ultrasound cannot be transmitted through bone.
10. _____ You must hold down the scan button until the scan is complete.

Competency Assessment for the BladderScan® (Answer Key)

POST TEST: MARK THE FOLLOWING STATEMENTS TRUE OR FALSE

1. F To ensure the highest degree of accuracy, the BladderScan® BVI 3000 instrument automatically saves the average bladder volume measurement from any series of scans.
The BladderScan® BVI 3000 automatically saves the largest bladder volume measurement from any series of scans, because in most cases, this is also the most accurate.
2. T Moving the Probe while scanning may result in artificially high bladder volume measurements. In this case, the operator should clear the scan results and re-scan the patient.
3. F The female gender should be selected for all female patients, because women's bladders are shaped differently than men's.
The female gender should be selected ONLY for female patients who have not undergone a hysterectomy. The female option allows the BladderScan® to differentiate for the presence of the uterus, which may resemble the bladder ultrasonically.
4. F A greater than symbol always indicates that the bladder is too large to scan accurately. In this situation, repositioning the Probe and re-scanning the patient won't help.
In most cases, the greater than symbol indicates that the Probe was not properly aimed and the bladder was not fully within range of the BladderScan® instrument; thus, the bladder volume measured is lower than the true bladder volume, and the Probe must be re-aimed and the scan repeated. If the bladder volume is greater than 999 cc, then the bladder is too large to be fully contained within the range of the Probe, and the measurement displayed is accurate and clinically useful, even though it is less than the true bladder volume.
5. T Sontac® gel pads are recommended to obtain the highest degree of accuracy.
6. F The bladder does not need to be centered in the scan plane (range of the Probe) for best results.
For best results, the Probe must be properly aimed so that the bladder is centered within the scan plane.
7. T The aiming icon on the BladderScan® LCD screen helps guide the operator to optimal Probe placement. If indicated by the aiming icon on the scan results screen, the operator should readjust the aim of the Probe and re-scan the patient to ensure maximum accuracy.
8. F Urinary catheters, scar tissue, incisions, sutures, surgical staples, and fluid-filled cysts may all interfere with the accuracy of the BladderScan® instrument. The BladderScan® should not be used on these patients.
Urinary catheters, scar tissue, incisions, sutures, surgical staples, and fluid-filled cysts may interfere with the accuracy of the BladderScan®, but in many cases, the BladderScan® can still be used. These patients should be assessed on an individual basis. If possible, scan above, beside, or below scar tissue or bandages.
9. T If the Probe needs to be aimed further downward, but is too close to the symphysis pubis, the operator should tilt the Probe so it points down into the pelvic cavity. This is because ultrasound cannot be transmitted through bone.
10. F You must hold down the scan button until the scan is complete.
It is not necessary to hold down the scan button during scanning; simply press and release the scan button to initiate the bladder volume measurement.

President's Statement

The team at Verathon® is committed to modernizing health care delivery by “Putting Patients First.” Our products support you, the health care provider, by providing the highest level of accuracy, utility, and excellence. Please contact us directly at 1.800.331.2313 (USA and Canada only) or 1.425.867.1348, if we can improve our service to you.

Gerald McMorrow

Gerald McMorrow, CEO, Founder and Chairman of the Board

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The BladderScan® technology referenced in this manual is protected by U.S. Patent Numbers 4,926,871, 5,235,985, 6,676,605, and 6,884,217. ScanPoint® technology is protected by U.S. Patent Number 6,569,097. The Sontac® ultrasound coupling medium is protected by U.S. Patent Number 5,782,767. Other international patents pending.

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Verathon Inc.

20001 North Creek Parkway
Bothell, WA 98011 USA
800.331.2313 (US and Canada)
425.867.1348
Fax: 425.883.2896
www.verathon.com

EU Representative

Verathon Medical (Europe) B.V.

Linnaeusweg 11
3401 MS IJsselstein
The Netherlands
+31.30.68.70.570
Fax: +31.30.68.70.512

Urological Health in the Acute Care Setting

Urinary problems afflict patients across the spectrum of Acute Care. Dr. Richard Pelman wrote “Urological Health in the Acute Care Setting,” to help physicians and nurses diagnose, manage, and treat urological disorders. In the manual, Pelman, a practicing Urologist, provides valuable information about the urinary problems commonly encountered in hospitals and rehabilitation centers and explains how the BladderScan[®] can be used to enhance methods of evaluation and treatment.

The manual contains a quick reference list of the primary indications for BladderScan[®] use and outlines protocols for different types of catheterization. It also contains chapters for specific hospital units, including:

- Medical/Surgical
- Rehabilitation
- Orthopedic
- Oncology
- Emergency Room
- Post-Operative
- Women’s Health
- Transitional Care
- Neurology
- Geriatric
- Pediatric
- Psychiatric

These chapters describe the urological conditions commonly encountered among patients in these units, and provide indications and protocols for BladderScan[®] use.

This manual is intended to serve as a resource when diagnosing, managing, and treating urinary problems.

Indications for BladderScan[®] Use

Acute Urinary Retention

Confirm acute retention. Ask the patient to void, and measure and record voided urine volume. Measure bladder residual volume with the BladderScan[®]. If the patient is unable to void, confirm bladder residual with the BladderScan[®]. If urinary residual volume is 300cc or greater, or if the patient is uncomfortable with a smaller volume (200cc), then proceed with the placement of a urinary catheter per Catheterization Protocol.

Key Points to Remember:

- Use a large bore catheter (22F) when catheterizing for clot retention.
- Use a 16F catheter for urine drainage.
- For pediatric patients, refer to pediatric guidelines for catheter size.

Chronic Urinary Retention:

If chronic urinary retention is suspected due to a patient history of frequent small voids, urinary incontinence, a palpable pelvic mass (less likely in cases of chronically distended bladder), or elevated serum creatinine, confirm chronic urinary retention as follows:

- Ask the patient to void.
- Measure and record the voided urine volume.
- Measure bladder residual volume with the BladderScan[®].
- If bladder volume is 300cc or greater, proceed with the Catheterization Protocol.

Urinary Incontinence:

Overflow incontinence from urinary retention should be the major indication for catheterization. Overflow retention should first be confirmed by asking the patient to void and measuring the voided volume, or quantifying the incontinent episode, and then using the BladderScan[®] to assess residual volume. If catheter placement is indicated, refer to the Catheterization Protocol. Do not catheterize for incontinence secondary to stress incontinence or urge incontinence.

Monitoring Urinary Output:

Urinary catheterization may occur for the monitoring of urine production. This typically occurs in the setting of the Emergency Room, Intensive Care Unit, or Medical–Surgical Unit, or during surgery. Refer to the Catheterization Protocol when placement of a catheter is required.

The BladderScan[®] provides a noninvasive means of monitoring the adequacy of hydration. Bladder volume may be monitored with the BladderScan[®] to determine urinary output. All units that utilize urinary catheterization for urine production monitoring might consider the use of the BladderScan[®] instead.

Neurogenic Bladder:

The neurogenic bladder may function in an impaired manner, either being areflexic (non-contractile) or hyperreflexic (overactive). Some neurogenic bladders also have an associated sphincter dysfunction, (i.e., coordinated or discoordinated sphincter function). Areflexic bladders may lead to urinary retention and require catheter decompression. Measure and record voided urine volume or attempt to quantify incontinent volume. Then measure residual bladder volume with the BladderScan[®]. Initiate catheterization per protocol, if indicated. Consider instituting the Intermittent Catheterization program described in this manual.

Urge Frequency Syndrome; The Overactive Bladder:

Urinary urgency and frequency have many potential etiologies. They are manifested in urinary tract infections, urinary malignancy, bladder calculi, overactive bladder, neurogenic bladder, radiation cystitis, interstitial cystitis, extravesicle pathology (pelvic mass), distal ureteral calculi, and urinary retention. In males, the most common etiology of urinary urgency is bladder outlet obstruction from B.P.H. Measure voided volume and measure residual volume with the BladderScan[®] to diagnose urinary retention, the only etiology requiring catheterization.

This syndrome comprises a group of patients, both male and female, who suffer from urinary urgency and urinary frequency. In the past, it was used to refer to patients with urinary urge incontinence. More recently, the term has expanded into a paradigm for describing patients who not only have incontinence as a manifestation of overactive bladder, but also suffer severe urinary frequency and urgency. The BladderScan[®] is clinically applicable not only in evaluating patients with incontinence from retention (thus differentiating their condition from urge incontinence), but also in acting as a behavioral feedback data mechanism to facilitate the modification of voiding behavior.

Voiding Trials:

Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan[®].

The decision to re-introduce a urinary catheter should be made based upon symptoms of pain or persistent high residual urinary volumes.

Painful Voiding Syndrome:

This condition represents many possible pathological diagnoses. Its main feature is pain with urine storage. It may indicate acute or chronic cystitis (i.e., bladder infection), carcinoma in situ, transitional cell cancer of the bladder or other malignancy, radiation cystitis, chemical cystitis, urinary retention, or interstitial cystitis.

BladderScan[®] use is indicated to evaluate bladder volume and diagnose urinary retention.

Assessment of Bladder Volume in Establishing a Voiding Schedule:

Patients with the symptoms of overactive bladder from neurogenic or non-neurogenic causes, and patients with some types of urinary incontinence, may benefit when placed on timed voiding schedules. Patients on such schedules will void at predetermined times, rather than by sensation or necessity. The BladderScan[®] is an excellent, noninvasive tool for determining bladder volume when establishing a voiding schedule.

Catheterization Protocols

Male Catheterization:

Prepare a sterile field. Complete a sterile preparation of the glans penis.

Insert 10 cc of sterile Xylocaine jelly into the urinary meatus. If Xylocaine jelly is not available, use sterile lubricant by placing 10 to 15 cc of sterile lubricant into a 50 cc catheter tip syringe. Place the nozzle of the catheter tip syringe into the urinary meatus. Inject the entire syringe of lubricant.

Hold the urethra closed with gentle digital compression and insert catheter.

Catheterization for Bleeding:

Use a large bore catheter (.22fr). If persistent hematuria is suspected, contemplate placement of a three-way catheter for continuous bladder irrigation. Hand irrigate catheter through the drainage port to evacuate clots. Hand irrigate by first priming the bladder with 50-100 cc of sterile irrigation fluid before attempting to withdraw the instilled fluid. Always irrigate via the drainage port, regardless of whether the catheter is a two-way or three-way. Always prime via the drainage port regardless of catheter type. If catheter is difficult to irrigate, push catheter back into the meatus and repeat attempt to evacuate clot.

Catheterization for Urinary Retention:

Use a 16 French urinary catheter. An 18 French catheter may also be used.

Difficult Catheterization:

If attempts with standard catheter fail, attempt to catheterize with a Coude tip catheter. Begin with a 16fr catheter. Keep the point of the Coude tip oriented at 12:00. The balloon port also is oriented to come off the catheter at 12:00, once the tip disappears inside the urinary meatus; orientation can be maintained by using the balloon stem as a reference.

Intermittent Catheterization Protocol:

Utilize sterile technique while in the hospital inpatient setting. Teach clean technique for patients who will either be undergoing intermittent catheterization at home or practicing self-intermittent catheterization.

In all cases, after initial catheterization is completed, obtain urine from the catheter for a urine culture. Then connect the catheter to drainage.

Female Catheterization:

Prepare a sterile field. Complete a sterile preparation of the urinary meatus and vaginal introital area. Place 2% Xylocaine jelly on 2 sterile Q-tips and insert into the urinary meatus 2 minutes prior to catheter placement. Remove Q-tips from urethra, and introduce a 16fr catheter. Alternatively, place a small amount of Xylocaine jelly onto the catheter tip, and insert catheter.

Catheterization for Bleeding (Gross Hematuria):

See protocol referenced above, after male catheterization.

Catheterization for Urinary Retention:

See protocol referenced above, after male catheterization.

Medical-Surgical Units

Patients on the Medical-Surgical Unit suffer from a wide variety of conditions. Many patients carry multiple diagnoses and coexistent problems. Consider the patient with cardiac disease or diabetes who is recovering from a surgical procedure. The patient may have been catheterized for urinary monitoring and, after catheter removal, may be found to have developed voiding problems such as retention, frequent voiding, or urinary incontinence. In some instances, a patient who has not been catheterized may present with the same complaints. The BladderScan[®] helps caregivers to identify the patient's situation so appropriate treatment can be prescribed.

The BladderScan[®] provides Medical-Surgical Unit staff with efficient, noninvasive, and document-oriented data that greatly improves patient care. All staff members can routinely use the BladderScan[®] to determine patient bladder volume (something that is not true for catheterization). This translates into more rapid diagnosis and treatment for the patient, better utilization of care delivery, and improved, consistent documentation of care provided (a must for hospital reimbursement).

Other situations likely to be found on the Medical-Surgical Unit that indicate BladderScan[®] use include:

Acute Urinary Retention:

Confirm acute retention. Ask the patient to void, and measure and record voided urine volume. Measure bladder residual volume with the BladderScan[®]. If the patient is unable to void, confirm bladder residual with the BladderScan[®]. If urinary residual volume is 300cc or greater, or if the patient is uncomfortable with a smaller volume (200cc), then proceed with the placement of a urinary catheter per Catheterization Protocol.

Key Points to Remember:

- Use a large bore catheter (22F) when catheterizing for clot retention.
- Use a 16F catheter for urine drainage.
- For pediatric patients, refer to pediatric guidelines for catheter size.

Chronic Urinary Retention:

If chronic urinary retention is suspected due to a patient history of frequent small voids, urinary incontinence, a palpable pelvic mass (less likely in cases of chronically distended bladder), or elevated serum creatinine, confirm chronic urinary retention as follows:

- Ask the patient to void.
- Measure and record the voided urine volume.
- Measure bladder residual volume with the BladderScan[®].
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Urinary Incontinence:

Overflow incontinence from urinary retention should be the major indication for catheterization. Overflow retention should first be confirmed by asking the patient to void and measuring the voided volume, or quantifying the incontinent episode, and then using the BladderScan[®] to assess residual volume. If catheter placement is indicated, refer to the Catheterization Protocol. Do not catheterize for incontinence secondary to stress incontinence or urge incontinence.

Monitoring Urinary Output:

Urinary catheterization may occur for the monitoring of urine production. This typically occurs in the setting of the Emergency Room, Intensive Care Unit, or Medical–Surgical Unit, or during surgery. Refer to the Catheterization Protocol when placement of a catheter is required.

The BladderScan® provides a noninvasive means of monitoring the adequacy of hydration. Bladder volume may be monitored with the BladderScan® to determine urinary output. All units that utilize urinary catheterization for urine production monitoring might consider the use of the BladderScan® instead.

Urge Frequency Syndrome; The Overactive Bladder:

Urinary urgency and frequency have many potential etiologies. They are manifested in urinary tract infections, urinary malignancy, bladder calculi, overactive bladder, neurogenic bladder, radiation cystitis, interstitial cystitis, extravesicle pathology (pelvic mass), distal ureteral calculi, and urinary retention. In males, the most common etiology of urinary urgency is bladder outlet obstruction from B.P.H. Measure voided volume and measure residual volume with the BladderScan® to diagnose urinary retention, the only etiology requiring catheterization.

This syndrome comprises a group of patients, both male and female, who suffer from urinary urgency and urinary frequency. In the past, it was used to refer to patients with urinary urge incontinence. More recently, the term has expanded into a paradigm for describing patients who not only have incontinence as a manifestation of overactive bladder, but also suffer severe urinary frequency and urgency. The BladderScan® is clinically applicable not only in evaluating patients with incontinence from retention (thus differentiating their condition from urge incontinence), but also in acting as a behavioral feedback data mechanism to facilitate the modification of voiding behavior.

Voiding Trials:

Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan®.

The decision to re-introduce a urinary catheter should be made based upon symptoms of pain or persistent high residual urinary volumes.

Assessment of Bladder Volume in Establishing a Voiding Schedule:

Patients with the symptoms of overactive bladder from neurogenic or non-neurogenic causes, and patients with some types of urinary incontinence, may benefit when placed on timed voiding schedules. Patients on such schedules will void at predetermined times, rather than by sensation or necessity. The BladderScan® is an excellent, noninvasive tool for determining bladder volume when establishing a voiding schedule.

Rehabilitation Units

Patients in the Rehabilitation Unit present a multitude of varied conditions. Many of these patients are recovering from multiple medical conditions causing multiple system problems, chronic disease, or the aftermath of surgical intervention. Others may simply suffer from frail health status due to advanced age.

Rehabilitation Unit staff may also see patients who have experienced recent or chronic neurological problems, acute cerebral vascular accidents, or spinal cord injury. Thus, coupled with all other ongoing bladder conditions, the presentation of neurogenic bladder is more frequent in this unit. This presents the institution with a need for various bladder protocols. The BladderScan® is extremely useful in the initiation and continued delivery of these protocols to the rehabilitating patient. For example, the BladderScan® is helpful when teaching patients to follow timed voiding schedules and using pharmacological agents to prevent incontinence, in cases of overactive bladder function as a result of a neurological disease (like multiple sclerosis). Urinary volumes must be monitored regularly to titrate medication against symptoms of urinary frequency, urgency and incontinence. Urinary retention and large residual volumes are avoided by using the BladderScan® to monitor bladder volume. Patients with neurogenic bladders that cease to function may benefit from BladderScan® determination of bladder volume during the institution of self-intermittent catheterization programs.

The advantage of the BladderScan® is that all care delivery staff, not just a few ‘catheterization specialists,’ can utilize it. It thus provides for the more efficient administration and documentation of care.

Acute Urinary Retention:

Confirm acute retention. Ask the patient to void, and measure and record voided urine volume. Measure bladder residual volume with the BladderScan®. If the patient is unable to void, confirm bladder residual with the BladderScan®. If urinary residual volume is 300cc or greater, or if the patient is uncomfortable with a smaller volume (200cc), then proceed with the placement of a urinary catheter per Catheterization Protocol.

Key Points to Remember:

- Use a large bore catheter (22F) when catheterizing for clot retention.
- Use a 16F catheter for urine drainage.
- For pediatric patients, refer to pediatric guidelines for catheter size.

Chronic Urinary Retention:

If chronic urinary retention is suspected due to a patient history of frequent small voids, urinary incontinence, a palpable pelvic mass (less likely in cases of chronically distended bladder), or elevated serum creatinine, confirm chronic urinary retention as follows:

- Ask the patient to void.
- Measure and record the voided urine volume.
- Measure bladder residual volume with the BladderScan®.
- If bladder volume is 300cc or greater, proceed with the Catheterization Protocol.

Urinary Incontinence:

Overflow incontinence from urinary retention should be the major indication for catheterization. Overflow retention should first be confirmed by asking the patient to void and measuring the voided volume, or quantifying the incontinent episode, and then using the BladderScan[®] to assess residual volume. If catheter placement is indicated, refer to the Catheterization Protocol. Do not catheterize for incontinence secondary to stress incontinence or urge incontinence.

Monitoring Urinary Output:

Urinary catheterization may occur for the monitoring of urine production. This typically occurs in the setting of the Emergency Room, Intensive Care Unit, or Medical–Surgical Unit, or during surgery. Refer to the Catheterization Protocol when placement of a catheter is required.

The BladderScan[®] provides a noninvasive means of monitoring the adequacy of hydration. Bladder volume may be monitored with the BladderScan[®] to determine urinary output. All units that utilize urinary catheterization for urine production monitoring might consider the use of the BladderScan[®] instead.

Neurogenic Bladder:

The neurogenic bladder may function in an impaired manner, either being areflexic (non-contractile) or hyperreflexic (overactive). Some neurogenic bladders also have an associated sphincter dysfunction, (i.e., coordinated or discoordinated sphincter function). Areflexic bladders may lead to urinary retention and require catheter decompression. Measure and record voided urine volume or attempt to quantify incontinent volume. Then measure residual bladder volume with the BladderScan[®]. Initiate catheterization per protocol, if indicated. Consider instituting the Intermittent Catheterization program described in this manual.

Urge Frequency Syndrome; The Overactive Bladder:

Urinary urgency and frequency have many potential etiologies. They are manifested in urinary tract infections, urinary malignancy, bladder calculi, overactive bladder, neurogenic bladder, radiation cystitis, interstitial cystitis, extravesicle pathology (pelvic mass), distal ureteral calculi, and urinary retention. In males, the most common etiology of urinary urgency is bladder outlet obstruction from B.P.H. Measure voided volume and measure residual volume with the BladderScan[®] to diagnose urinary retention, the only etiology requiring catheterization.

This syndrome comprises a group of patients, both male and female, who suffer from urinary urgency and urinary frequency. In the past, it was used to refer to patients with urinary urge incontinence. More recently, the term has expanded into a paradigm for describing patients who not only have incontinence as a manifestation of overactive bladder, but also suffer severe urinary frequency and urgency. The BladderScan[®] is clinically applicable not only in evaluating patients with incontinence from retention (thus differentiating their condition from urge incontinence), but also in acting as a behavioral feedback data mechanism to facilitate the modification of voiding behavior.

Voiding Trials:

Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan[®].

The decision to re-introduce a urinary catheter should be made based upon symptoms of pain or persistent high residual urinary volumes.

Painful Voiding Syndrome:

This condition represents many possible pathological diagnoses. Its main feature is pain with urine storage. It may indicate acute or chronic cystitis (i.e., bladder infection), carcinoma in situ, transitional cell cancer of the bladder or other malignancy, radiation cystitis, chemical cystitis, urinary retention, or interstitial cystitis.

BladderScan[®] use is indicated to evaluate bladder volume and diagnose urinary retention.

Assessment of Bladder Volume in Establishing a Voiding Schedule:

Patients with the symptoms of overactive bladder from neurogenic or non-neurogenic causes, and patients with some types of urinary incontinence, may benefit when placed on timed voiding schedules. Patients on such schedules will void at predetermined times, rather than by sensation or necessity. The BladderScan[®] is an excellent, noninvasive tool for determining bladder volume when establishing a voiding schedule.

Orthopedic Units

Orthopedic patients are usually recuperating from orthopedic procedures and may also be receiving physical therapy and rehabilitation. Many of these patients also suffer from multiple, acute or chronic medical conditions. Patients are often catheterized during surgery, and then the catheter is removed in the immediate postoperative period where pain, limited mobility, and a debilitated state may exacerbate voiding difficulties. In such cases, urinary retention is not uncommon with symptoms including urinary frequency, urgency and incontinence. The BladderScan® is very helpful in expediting correct diagnosis and thus, the implementation of appropriate therapy.

Acute Urinary Retention:

Confirm acute retention. Ask the patient to void, and measure and record voided urine volume. Measure bladder residual volume with the BladderScan®. If the patient is unable to void, confirm bladder residual with the BladderScan®. If urinary residual volume is 300cc or greater, or if the patient is uncomfortable with a smaller volume (200cc), then proceed with the placement of a urinary catheter per Catheterization Protocol.

Key Points to Remember:

- Use a large bore catheter (22F) when catheterizing for clot retention.
- Use a 16F catheter for urine drainage.
- For pediatric patients, refer to pediatric guidelines for catheter size.

Chronic Urinary Retention:

If chronic urinary retention is suspected due to a patient history of frequent small voids, urinary incontinence, a palpable pelvic mass (less likely in cases of chronically distended bladder), or elevated serum creatinine, confirm chronic urinary retention as follows:

- Ask the patient to void.
- Measure and record the voided urine volume.
- Measure bladder residual volume with the BladderScan®.
- If bladder volume is 300cc or greater, proceed with the Catheterization Protocol.

Urinary Incontinence:

Overflow incontinence from urinary retention should be the major indication for catheterization. Overflow retention should first be confirmed by asking the patient to void and measuring the voided volume, or quantifying the incontinent episode, and then using the BladderScan® to assess residual volume. If catheter placement is indicated, refer to the Catheterization Protocol. Do not catheterize for incontinence secondary to stress incontinence or urge incontinence.

Neurogenic Bladder:

The neurogenic bladder may function in an impaired manner, either being areflexic (non-contractile) or hyperreflexic (overactive). Some neurogenic bladders also have an associated sphincter dysfunction, (i.e., coordinated or discoordinated sphincter function). Areflexic bladders may lead to urinary retention and require catheter decompression. Measure and record voided urine volume or attempt to quantify incontinent volume. Then measure residual bladder volume with the BladderScan®. Initiate catheterization per protocol, if indicated. Consider instituting the Intermittent Catheterization program described in this manual.

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Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan[®].

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Oncology Units

Oncology patients may develop severe or acute chemical cystitis as a complication of certain chemotherapeutic agents. The prophylactic principle for minimizing this risk is hydration. The BladderScan[®] is very useful in establishing the adequacy of bladder filling.

Oncology patients may also suffer from acute or chronic urinary retention, or require the evaluation of urinary urgency and frequency or of voiding success after catheter removal. Painful bladder may also be experienced by these patients, and retention should be ruled out. The BladderScan[®] will assist caregivers in evaluating and documenting these problems.

Acute Urinary Retention:

Confirm acute retention. Ask the patient to void, and measure and record voided urine volume. Measure bladder residual volume with the BladderScan[®]. If the patient is unable to void, confirm bladder residual with the BladderScan[®]. If urinary residual volume is 300cc or greater, or if the patient is uncomfortable with a smaller volume (200cc), then proceed with the placement of a urinary catheter per Catheterization Protocol.

Key Points to Remember:

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- Ask the patient to void.
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Monitoring Urinary Output:

Urinary catheterization may occur for the monitoring of urine production. This typically occurs in the setting of the Emergency Room, Intensive Care Unit, or Medical–Surgical Unit, or during surgery. Refer to the Catheterization Protocol when placement of a catheter is required.

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BladderScan[®] use is indicated to evaluate bladder volume and diagnose urinary retention.

Emergency Room

The Emergency Room may at times function as a walk-in clinic, providing a simple way for patients to seek medical care. In this situation, any of the myriad voiding complaints may be seen. Irritate or obstructive voiding symptoms, as well as painful bladder symptoms, may be encountered. The BladderScan® can help caregivers sort out these problems.

The Emergency Room patient may also suffer from acute trauma or a true medical emergency, requiring urinary output monitoring. If no urinary output occurs after catheterization, the BladderScan® can be used to determine the adequacy of catheterization (i.e., is the bladder really empty or is the bladder full, implying that the catheter is not in the bladder).

The BladderScan® will also be useful in determining the adequacy of voiding after catheter removal. Thus, the BladderScan® has many potential uses in the Emergency Room setting.

Acute Urinary Retention:

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Voiding Trials:

Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan[®].

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This condition represents many possible pathological diagnoses. Its main feature is pain with urine storage. It may indicate acute or chronic cystitis (i.e., bladder infection), carcinoma in situ, transitional cell cancer of the bladder or other malignancy, radiation cystitis, chemical cystitis, urinary retention, or interstitial cystitis.

BladderScan[®] use is indicated to evaluate bladder volume and diagnose urinary retention.

Post-Operative Surgical Units/Recovery Room/ Short Stay Medical and Surgical Units

The BladderScan[®] provides Medical and Surgical staff on Short Stay Units with a noninvasive means of establishing bladder volume and hence, information regarding the necessity of voiding. In many instances, discharge from a Short Stay Unit is predicated at least in part on the patient's ability to void, particularly among postoperative patients. Many patients spend extended hours on such units awaiting discharge pending a successful void. If the BladderScan[®] was used to ascertain bladder volume noninvasively, the patient might be found to require hydration, which would expedite bladder filling, speed up the voiding trial process, and hasten the patient's discharge. Conversely, BladderScan[®] use might reveal that the patient already has a significant bladder volume and is in need of bladder decompression.

Other circumstances also exist on the Short Stay Unit which require the determination of bladder volume and thus, the use of the BladderScan[®].

Acute Urinary Retention:

Confirm acute retention. Ask the patient to void, and measure and record voided urine volume. Measure bladder residual volume with the BladderScan[®]. If the patient is unable to void, confirm bladder residual with the BladderScan[®]. If urinary residual volume is 300cc or greater, or if the patient is uncomfortable with a smaller volume (200cc), then proceed with the placement of a urinary catheter per Catheterization Protocol.

Key Points to Remember:

- Use a large bore catheter (22F) when catheterizing for clot retention.
- Use a 16F catheter for urine drainage.
- For pediatric patients, refer to pediatric guidelines for catheter size.

Chronic Urinary Retention:

If chronic urinary retention is suspected due to a patient history of frequent small voids, urinary incontinence, a palpable pelvic mass (less likely in cases of chronically distended bladder), or elevated serum creatinine, confirm chronic urinary retention as follows:

- Ask the patient to void.
- Measure and record the voided urine volume.
- Measure bladder residual volume with the BladderScan[®].
- If bladder volume is 300cc or greater, proceed with the Catheterization Protocol.

Urinary Incontinence:

Overflow incontinence from urinary retention should be the major indication for catheterization. Overflow retention should first be confirmed by asking the patient to void and measuring the voided volume, or quantifying the incontinent episode, and then using the BladderScan[®] to assess residual volume. If catheter placement is indicated, refer to the Catheterization Protocol. Do not catheterize for incontinence secondary to stress incontinence or urge incontinence.

Monitoring Urinary Output:

Urinary catheterization may occur for the monitoring of urine production. This typically occurs in the setting of the Emergency Room, Intensive Care Unit, or Medical–Surgical Unit, or during surgery. Refer to the Catheterization Protocol when placement of a catheter is required.

The BladderScan[®] provides a noninvasive means of monitoring the adequacy of hydration. Bladder volume may be monitored with the BladderScan[®] to determine urinary output. All units that utilize urinary catheterization for urine production monitoring might consider the use of the BladderScan[®] instead.

Neurogenic Bladder:

The neurogenic bladder may function in an impaired manner, either being areflexic (non-contractile) or hyperreflexic (overactive). Some Neurogenic bladders also have an associated sphincter dysfunction, (i.e., coordinated or discoordinated sphincter function). Areflexic bladders may lead to urinary retention and require catheter decompression. Measure and record voided urine volume or attempt to quantify incontinent volume. Then measure residual bladder volume with the BladderScan[®]. Initiate catheterization per protocol, if indicated. Consider instituting the Intermittent Catheterization program described in this manual.

Urge Frequency Syndrome; The Overactive Bladder:

Urinary urgency and frequency have many potential etiologies. They are manifested in urinary tract infections, urinary malignancy, bladder calculi, overactive bladder, neurogenic bladder, radiation cystitis, interstitial cystitis, extravesicle pathology (pelvic mass), distal ureteral calculi, and urinary retention. In males, the most common etiology of urinary urgency is bladder outlet obstruction from B.P.H. Measure voided volume and measure residual volume with the BladderScan[®] to diagnose urinary retention, the only etiology requiring catheterization.

This syndrome comprises a group of patients, both male and female, who suffer from urinary urgency and urinary frequency. In the past, it was used to refer to patients with urinary urge incontinence. More recently, the term has expanded into a paradigm for describing patients who not only have incontinence as a manifestation of overactive bladder, but also suffer severe urinary frequency and urgency. The BladderScan[®] is clinically applicable not only in evaluating patients with incontinence from retention (thus differentiating their condition from urge incontinence), but also in acting as a behavioral feedback data mechanism to facilitate the modification of voiding behavior.

Voiding Trials:

Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan[®].

The decision to re-introduce a urinary catheter should be made based upon symptoms of pain or persistent high residual urinary volumes.

Woman's Hospital/ Obstetrical Gynecologic Units/ Woman's Clinic

The Women's Hospital offers complete treatment and services for female patients. It encompasses traditional inpatient Ob-Gyn units, as well as multiple other services. Many of these services are located in outpatient clinics. The Female Incontinence Clinic is part of the Women's Hospital concept, and may be found within its walls.

Many types of voiding problems are encountered in the Women's Hospital. On the Labor and Delivery floor, a woman may require the BladderScan[®] to evaluate the need for catheterization. This may also be true in the postpartum period. Similar circumstances may be found among postoperative gynecologic patients.

In the outpatient setting, voiding complaints may range from urinary retention to urgency, frequency, and painful bladder symptoms. The BladderScan[®] is useful in evaluating urinary retention and may also prove vital in demonstrating to patients that they have successfully emptied their bladders in circumstances of frequent voiding.

The BladderScan[®] is also useful in evaluating incontinence and recurrent urinary tract infection.

Acute Urinary Retention:

Confirm acute retention. Ask the patient to void, and measure and record voided urine volume. Measure bladder residual volume with the BladderScan[®]. If the patient is unable to void, confirm bladder residual with the BladderScan[®]. If urinary residual volume is 300cc or greater, or if the patient is uncomfortable with a smaller volume (200cc), then proceed with the placement of a urinary catheter per Catheterization Protocol.

Key Points to Remember:

- Use a large bore catheter (22F) when catheterizing for clot retention.
- Use a 16F catheter for urine drainage.
- For pediatric patients, refer to pediatric guidelines for catheter size.

Urinary Incontinence:

Overflow incontinence from urinary retention should be the major indication for catheterization. Overflow retention should first be confirmed by asking the patient to void and measuring the voided volume, or quantifying the incontinent episode, and then using the BladderScan[®] to assess residual volume. If catheter placement is indicated, refer to the Catheterization Protocol. Do not catheterize for incontinence secondary to stress incontinence or urge incontinence.

Monitoring Urinary Output:

Urinary catheterization may occur for the monitoring of urine production. This typically occurs in the setting of the Emergency Room, Intensive Care Unit, or Medical–Surgical Unit, or during surgery. Refer to the Catheterization Protocol when placement of a catheter is required.

The BladderScan[®] provides a noninvasive means of monitoring the adequacy of hydration. Bladder volume may be monitored with the BladderScan[®] to determine urinary output. All units that utilize urinary catheterization for urine production monitoring might consider the use of the BladderScan[®] instead.

Urge Frequency Syndrome – The Overactive Bladder:

Urinary urgency and frequency have many potential etiologies. They are manifested in urinary tract infections, urinary malignancy, bladder calculi, overactive bladder, neurogenic bladder, radiation cystitis, interstitial cystitis, extravescicle pathology (pelvic mass), distal ureteral calculi, and urinary retention. In males, the most common etiology of urinary urgency is bladder outlet obstruction from B.P.H. Measure voided volume and measure residual volume with the BladderScan[®] to diagnose urinary retention, the only etiology requiring catheterization.

This syndrome comprises a group of patients, both male and female, who suffer from urinary urgency and urinary frequency. In the past, it was used to refer to patients with urinary urge incontinence. More recently, the term has expanded into a paradigm for describing patients who not only have incontinence as a manifestation of overactive bladder, but also suffer severe urinary frequency and urgency. The BladderScan[®] is clinically applicable not only in evaluating patients with incontinence from retention (thus differentiating their condition from urge incontinence), but also in acting as a behavioral feedback data mechanism to facilitate the modification of voiding behavior.

Voiding Trials:

Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan[®].

The decision to re-introduce a urinary catheter should be made based upon symptoms of pain or persistent high residual urinary volumes.

Painful Voiding Syndrome:

This condition represents many possible pathological diagnoses. Its main feature is pain with urine storage. It may indicate acute or chronic cystitis (i.e., bladder infection), carcinoma in situ, transitional cell cancer of the bladder or other malignancy, radiation cystitis, chemical cystitis, urinary retention, or interstitial cystitis.

BladderScan[®] use is indicated to evaluate bladder volume and diagnose urinary retention.

Assessment of Bladder Volume in Establishing a Voiding Schedule:

Patients with the symptoms of overactive bladder from neurogenic or non-neurogenic causes, and patients with some types of urinary incontinence, may benefit when placed on timed voiding schedules. Patients on such schedules will void at predetermined times, rather than by sensation or necessity. The BladderScan[®] is an excellent, noninvasive tool for determining bladder volume when establishing a voiding schedule.

Transitional Care Units

Patients on the Transitional Care Unit experience all levels of illness and recovery. They comprise a group of patients from both medical and surgical floors who have recovered sufficiently that they no longer need intensive skilled nursing or diagnostic evaluation, but are still in need of assistance with the activities of daily living. They may be awaiting nursing home placement, or looking forward to returning home once recovery is complete. These patients can experience a variety of voiding problems.

Acute Urinary Retention:

Confirm acute retention. Ask the patient to void, and measure and record voided urine volume. Measure bladder residual volume with the BladderScan[®]. If the patient is unable to void, confirm bladder residual with the BladderScan[®]. If urinary residual volume is 300cc or greater, or if the patient is uncomfortable with a smaller volume (200cc), then proceed with the placement of a urinary catheter per Catheterization Protocol.

Key Points to Remember:

- Use a large bore catheter (22F) when catheterizing for clot retention.
- Use a 16F catheter for urine drainage.
- For pediatric patients, refer to pediatric guidelines for catheter size.

Chronic Urinary Retention:

If chronic urinary retention is suspected due to a patient history of frequent small voids, urinary incontinence, a palpable pelvic mass (less likely in cases of chronically distended bladder), or elevated serum creatinine, confirm chronic urinary retention as follows:

- Ask the patient to void.
- Measure and record the voided urine volume.
- Measure bladder residual volume with the BladderScan[®].
- If bladder volume is 300cc or greater, proceed with the Catheterization Protocol.

Urinary Incontinence:

Overflow incontinence from urinary retention should be the major indication for catheterization. Overflow retention should first be confirmed by asking the patient to void and measuring the voided volume, or quantifying the incontinent episode, and then using the BladderScan[®] to assess residual volume. If catheter placement is indicated, refer to the Catheterization Protocol. Do not catheterize for incontinence secondary to stress incontinence or urge incontinence.

Monitoring Urinary Output:

Urinary catheterization may occur for the monitoring of urine production. This typically occurs in the setting of the Emergency Room, Intensive Care Unit, or Medical–Surgical Unit, or during surgery. Refer to the Catheterization Protocol when placement of a catheter is required.

The BladderScan[®] provides a noninvasive means of monitoring the adequacy of hydration. Bladder volume may be monitored with the BladderScan[®] to determine urinary output. All units that utilize urinary catheterization for urine production monitoring might consider the use of the BladderScan[®] instead.

Neurogenic Bladder:

The neurogenic bladder may function in an impaired manner, either being areflexic (non-contractile) or hyperreflexic (overactive). Some neurogenic bladders also have an associated sphincter dysfunction, (i.e., coordinated or discoordinated sphincter function). Areflexic bladders may lead to urinary retention and require catheter decompression. Measure and record voided urine volume or attempt to quantify incontinent volume. Then measure residual bladder volume with the BladderScan®. Initiate catheterization per protocol, if indicated. Consider instituting the Intermittent Catheterization program described in this manual.

Urge Frequency Syndrome; The Overactive Bladder:

Urinary urgency and frequency have many potential etiologies. They are manifested in urinary tract infections, urinary malignancy, bladder calculi, overactive bladder, neurogenic bladder, radiation cystitis, interstitial cystitis, extravesicle pathology (pelvic mass), distal ureteral calculi, and urinary retention. In males, the most common etiology of urinary urgency is bladder outlet obstruction from B.P.H. Measure voided volume and measure residual volume with the BladderScan® to diagnose urinary retention, the only etiology requiring catheterization.

This syndrome comprises a group of patients, both male and female, who suffer from urinary urgency and urinary frequency. In the past, it was used to refer to patients with urinary urge incontinence. More recently, the term has expanded into a paradigm for describing patients who not only have incontinence as a manifestation of overactive bladder, but also suffer severe urinary frequency and urgency. The BladderScan® is clinically applicable not only in evaluating patients with incontinence from retention (thus differentiating their condition from urge incontinence), but also in acting as a behavioral feedback data mechanism to facilitate the modification of voiding behavior.

Voiding Trials:

Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan®.

The decision to re-introduce a urinary catheter should be made based upon symptoms of pain or persistent high residual urinary volumes.

Assessment of Bladder Volume in Establishing a Voiding Schedule:

Patients with the symptoms of overactive bladder from neurogenic or non-neurogenic causes, and patients with some types of urinary incontinence, may benefit when placed on timed voiding schedules. Patients on such schedules will void at predetermined times, rather than by sensation or necessity. The BladderScan® is an excellent, noninvasive tool for determining bladder volume when establishing a voiding schedule.

Neurology/Neuro-Surgical Units

Neurogenic bladder may be more frequently encountered in Neurology and Neuro-Surgical Units. Neurogenic bladder encompasses a range of bladder function and dysfunction. It may represent bladder overactivity (detrussor hyperreflexia), loss of bladder contractility (detrussor areflexia), or a normally contractile bladder. Detrussor instability refers to bladder overactivity from non-neurogenic causes and, like Detrussor hyperreflexia, is manifested by urinary urge incontinence, urinary frequency, and urinary urgency. The BladderScan[®] aids caregivers in differentiating urinary incontinence due to retention from incontinence due to overactivity.

Acute Urinary Retention:

Confirm acute retention. Ask the patient to void, and measure and record voided urine volume. Measure bladder residual volume with the BladderScan[®]. If the patient is unable to void, confirm bladder residual with the BladderScan[®]. If urinary residual volume is 300cc or greater, or if the patient is uncomfortable with a smaller volume (200cc), then proceed with the placement of a urinary catheter per Catheterization Protocol.

Key Points to Remember:

- Use a large bore catheter (22F) when catheterizing for clot retention.
- Use a 16F catheter for urine drainage.
- For pediatric patients, refer to pediatric guidelines for catheter size.

Chronic Urinary Retention:

If chronic urinary retention is suspected due to a patient history of frequent small voids, urinary incontinence, a palpable pelvic mass (less likely in cases of chronically distended bladder), or elevated serum creatinine, confirm chronic urinary retention as follows:

- Ask the patient to void.
- Measure and record the voided urine volume.
- Measure bladder residual volume with the BladderScan[®].
- If bladder volume is 300cc or greater, proceed with the Catheterization Protocol.

Urinary Incontinence:

Overflow incontinence from urinary retention should be the major indication for catheterization. Overflow retention should first be confirmed by asking the patient to void and measuring the voided volume, or quantifying the incontinent episode, and then using the BladderScan[®] to assess residual volume. If catheter placement is indicated, refer to the Catheterization Protocol. Do not catheterize for incontinence secondary to stress incontinence or urge incontinence.

Monitoring Urinary Output:

Urinary catheterization may occur for the monitoring of urine production. This typically occurs in the setting of the Emergency Room, Intensive Care Unit, or Medical–Surgical Unit, or during surgery. Refer to the Catheterization Protocol when placement of a catheter is required.

The BladderScan[®] provides a noninvasive means of monitoring the adequacy of hydration. Bladder volume may be monitored with the BladderScan[®] to determine urinary output. All units that utilize urinary catheterization for urine production monitoring might consider the use of the BladderScan[®] instead.

Neurogenic Bladder:

The neurogenic bladder may function in an impaired manner, either being areflexic (non-contractile) or hyperreflexic (overactive). Some neurogenic bladders also have an associated sphincter dysfunction, (i.e., coordinated or discoordinated sphincter function). Areflexic bladders may lead to urinary retention and require catheter decompression. Measure and record voided urine volume or attempt to quantify incontinent volume. Then measure residual bladder volume with the BladderScan[®]. Initiate catheterization per protocol, if indicated. Consider instituting the Intermittent Catheterization program described in this manual.

Urge Frequency Syndrome; The Overactive Bladder:

Urinary urgency and frequency have many potential etiologies. They are manifested in urinary tract infections, urinary malignancy, bladder calculi, overactive bladder, neurogenic bladder, radiation cystitis, interstitial cystitis, extravesicle pathology (pelvic mass), distal ureteral calculi, and urinary retention. In males, the most common etiology of urinary urgency is bladder outlet obstruction from B.P.H. Measure voided volume and measure residual volume with the BladderScan[®] to diagnose urinary retention, the only etiology requiring catheterization.

This syndrome comprises a group of patients, both male and female, who suffer from urinary urgency and urinary frequency. In the past, it was used to refer to patients with urinary urge incontinence. More recently, the term has expanded into a paradigm for describing patients who not only have incontinence as a manifestation of overactive bladder, but also suffer severe urinary frequency and urgency. The BladderScan[®] is clinically applicable not only in evaluating patients with incontinence from retention (thus differentiating their condition from urge incontinence), but also in acting as a behavioral feedback data mechanism to facilitate the modification of voiding behavior.

Voiding Trials:

Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan[®].

The decision to re-introduce a urinary catheter should be made based upon symptoms of pain or persistent high residual urinary volumes.

Painful Voiding Syndrome:

This condition represents many possible pathological diagnoses. Its main feature is pain with urine storage. It may indicate acute or chronic cystitis (i.e., bladder infection), carcinoma in situ, transitional cell cancer of the bladder or other malignancy, radiation cystitis, chemical cystitis, urinary retention, or interstitial cystitis.

BladderScan[®] use is indicated to evaluate bladder volume and diagnose urinary retention.

Assessment of Bladder Volume in Establishing a Voiding Schedule:

Patients with the symptoms of overactive bladder from neurogenic or non-neurogenic causes, and patients with some types of urinary incontinence, may benefit when placed on timed voiding schedules. Patients on such schedules will void at predetermined times, rather than by sensation or necessity. The BladderScan[®] is an excellent, noninvasive tool for determining bladder volume when establishing a voiding schedule.

Geriatric Units

Geriatric Units treat the problems associated with aging. The percentage of patients suffering urinary incontinence increases with age. The BladderScan[®] has an obvious advantage in the care and management of these patients' urinary symptoms. The ability to easily and quickly evaluate and document bladder volume not only provides the patient with more efficient assessment and therapy, it also promotes better care delivery by unit staff. As bladder volume determination with the BladderScan[®] reduces the time required to ascertain the etiology of urinary problems, it translates into more enthusiasm on the part of unit staff for investigating bladder complaints.

Acute Urinary Retention:

Confirm acute retention. Ask the patient to void, and measure and record voided urine volume. Measure bladder residual volume with the BladderScan[®]. If the patient is unable to void, confirm bladder residual with the BladderScan[®]. If urinary residual volume is 300cc or greater, or if the patient is uncomfortable with a smaller volume (200cc), then proceed with the placement of a urinary catheter per Catheterization Protocol.

Key Points to Remember:

- Use a large bore catheter (22F) when catheterizing for clot retention.
- Use a 16F catheter for urine drainage.
- For pediatric patients, refer to pediatric guidelines for catheter size.

Chronic Urinary Retention:

If chronic urinary retention is suspected due to a patient history of frequent small voids, urinary incontinence, a palpable pelvic mass (less likely in cases of chronically distended bladder), or elevated serum creatinine, confirm chronic urinary retention as follows:

- Ask the patient to void.
- Measure and record the voided urine volume.
- Measure bladder residual volume with the BladderScan[®].
- If bladder volume is 300cc or greater, proceed with the Catheterization Protocol.

Urinary Incontinence:

Overflow incontinence from urinary retention should be the major indication for catheterization. Overflow retention should first be confirmed by asking the patient to void and measuring the voided volume, or quantifying the incontinent episode, and then using the BladderScan[®] to assess residual volume. If catheter placement is indicated, refer to the Catheterization Protocol. Do not catheterize for incontinence secondary to stress incontinence or urge incontinence.

Monitoring Urinary Output:

Urinary catheterization may occur for the monitoring of urine production. This typically occurs in the setting of the Emergency Room, Intensive Care Unit, or Medical–Surgical Unit, or during surgery. Refer to the Catheterization Protocol when placement of a catheter is required.

The BladderScan[®] provides a noninvasive means of monitoring the adequacy of hydration. Bladder volume may be monitored with the BladderScan[®] to determine urinary output. All units that utilize urinary catheterization for urine production monitoring might consider the use of the BladderScan[®] instead.

Urge Frequency Syndrome; The Overactive Bladder:

Urinary urgency and frequency have many potential etiologies. They are manifested in urinary tract infections, urinary malignancy, bladder calculi, overactive bladder, neurogenic bladder, radiation cystitis, interstitial cystitis, extravesicle pathology (pelvic mass), distal ureteral calculi, and urinary retention. In males, the most common etiology of urinary urgency is bladder outlet obstruction from B.P.H. Measure voided volume and measure residual volume with the BladderScan[®] to diagnose urinary retention, the only etiology requiring catheterization.

This syndrome comprises a group of patients, both male and female, who suffer from urinary urgency and urinary frequency. In the past, it was used to refer to patients with urinary urge incontinence. More recently, the term has expanded into a paradigm for describing patients who not only have incontinence as a manifestation of overactive bladder, but also suffer severe urinary frequency and urgency. The BladderScan[®] is clinically applicable not only in evaluating patients with incontinence from retention (thus differentiating their condition from urge incontinence), but also in acting as a behavioral feedback data mechanism to facilitate the modification of voiding behavior.

Voiding Trials:

Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan[®].

The decision to re-introduce a urinary catheter should be made based upon symptoms of pain or persistent high residual urinary volumes.

Assessment of Bladder Volume in Establishing a Voiding Schedule:

Patients with the symptoms of overactive bladder from neurogenic or non-neurogenic causes, and patients with some types of urinary incontinence, may benefit when placed on timed voiding schedules. Patients on such schedules will void at predetermined times, rather than by sensation or necessity. The BladderScan[®] is an excellent, noninvasive tool for determining bladder volume when establishing a voiding schedule.

Pediatric Units

Pediatric Units may find it necessary to evaluate bladder volume in cases of neonatal distress. The need to determine a neonate's hydration status may also be an indication for BladderScan® use.

Older children with symptoms of Overactive Bladder may also require bladder volume determination. The measurement of residual bladder volume is indicated not only for evaluating an overactive bladder, but also for evaluating the child with a history of urinary tract infections.

Monitoring Urinary Output:

Urinary catheterization may occur for the monitoring of urine production. This typically occurs in the setting of the Emergency Room, Intensive Care Unit, or Medical–Surgical Unit, or during surgery. Refer to the Catheterization Protocol when placement of a catheter is required.

The BladderScan® provides a noninvasive means of monitoring the adequacy of hydration. Bladder volume may be monitored with the BladderScan® to determine urinary output. All units that utilize urinary catheterization for urine production monitoring might consider the use of the BladderScan® instead.

Neurogenic Bladder:

The neurogenic bladder may function in an impaired manner, either being areflexic (non-contractile) or hyperreflexic (overactive). Some neurogenic bladders also have an associated sphincter dysfunction, (i.e., coordinated or discoordinated sphincter function). Areflexic bladders may lead to urinary retention and require catheter decompression. Measure and record voided urine volume or attempt to quantify incontinent volume. Then measure residual bladder volume with the BladderScan®. Initiate catheterization per protocol, if indicated. Consider instituting the Intermittent Catheterization program described in this manual.

Urge Frequency Syndrome; The Overactive Bladder:

Urinary urgency and frequency have many potential etiologies. They are manifested in urinary tract infections, urinary malignancy, bladder calculi, overactive bladder, neurogenic bladder, radiation cystitis, interstitial cystitis, extravesicle pathology (pelvic mass), distal ureteral calculi, and urinary retention. In males, the most common etiology of urinary urgency is bladder outlet obstruction from B.P.H. Measure voided volume and measure residual volume with the BladderScan® to diagnose urinary retention, the only etiology requiring catheterization.

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Voiding Trials:

Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan®.

The decision to re-introduce a urinary catheter should be made based upon symptoms of pain or persistent high residual urinary volumes.

Painful Voiding Syndrome:

This condition represents many possible pathological diagnoses. Its main feature is pain with urine storage. It may indicate acute or chronic cystitis (i.e., bladder infection), carcinoma in situ, transitional cell cancer of the bladder or other malignancy, radiation cystitis, chemical cystitis, urinary retention, or interstitial cystitis.

BladderScan[®] use is indicated to evaluate bladder volume and diagnose urinary retention.

Verathon[®] also offers the Pediatric BladderScan[®] BVI 6200. This handheld, noninvasive ultrasound instrument is optimized for use on children up to 48" tall and weighing 60 lbs. or less.

Psychiatric Units

Psychiatric patients often require care for comorbid medical/ surgical conditions. Multiple types of voiding problems are encountered among these patients. While some voiding problems are the result of psychiatric medications, the symptoms of overactive bladder are not uncommon. The BladderScan® will be embraced by Psychiatric Unit staff and patients largely because of its ease of use and noninvasive approach to bladder volume determination. The alternative for Psychiatric Units without the BladderScan® is to consult a clinical specialist to catheterize the patient, or to send the patient to the Radiology Department. Neither of these alternatives provide efficiency, efficacy, or cost savings. The patient preference, of course, supports BladderScan® use due to its noninvasive quality.

Acute Urinary Retention:

Confirm acute retention. Ask the patient to void, and measure and record voided urine volume. Measure bladder residual volume with the BladderScan®. If the patient is unable to void, confirm bladder residual with the BladderScan®. If urinary residual volume is 300cc or greater, or if the patient is uncomfortable with a smaller volume (200cc), then proceed with the placement of a urinary catheter per Catheterization Protocol.

Key Points to Remember:

- Use a large bore catheter (22F) when catheterizing for clot retention.
- Use a 16F catheter for urine drainage.
- For pediatric patients, refer to pediatric guidelines for catheter size.

Chronic Urinary Retention:

If chronic urinary retention is suspected due to a patient history of frequent small voids, urinary incontinence, a palpable pelvic mass (less likely in cases of chronically distended bladder), or elevated serum creatinine, confirm chronic urinary retention as follows:

- Ask the patient to void.
- Measure and record the voided urine volume.
- Measure bladder residual volume with the BladderScan®.
- If bladder volume is 300cc or greater, proceed with the Catheterization Protocol.

Urinary Incontinence:

Overflow incontinence from urinary retention should be the major indication for catheterization. Overflow retention should first be confirmed by asking the patient to void and measuring the voided volume, or quantifying the incontinent episode, and then using the BladderScan® to assess residual volume. If catheter placement is indicated, refer to the Catheterization Protocol. Do not catheterize for incontinence secondary to stress incontinence or urge incontinence.

Monitoring Urinary Output:

Urinary catheterization may occur for the monitoring of urine production. This typically occurs in the setting of the Emergency Room, Intensive Care Unit, or Medical–Surgical Unit, or during surgery. Refer to the Catheterization Protocol when placement of a catheter is required.

The BladderScan® provides a noninvasive means of monitoring the adequacy of hydration. Bladder volume may be monitored with the BladderScan® to determine urinary output. All units that utilize urinary catheterization for urine production monitoring might consider the use of the BladderScan® instead.

Neurogenic Bladder:

The neurogenic bladder may function in an impaired manner, either being areflexic (non-contractile) or hyperreflexic (overactive). Some neurogenic bladders also have an associated sphincter dysfunction, (i.e., coordinated or discoordinated sphincter function). Areflexic bladders may lead to urinary retention and require catheter decompression. Measure and record voided urine volume or attempt to quantify incontinent volume. Then measure residual bladder volume with the BladderScan[®]. Initiate catheterization per protocol, if indicated. Consider instituting the Intermittent Catheterization program described in this manual.

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Urinary urgency and frequency have many potential etiologies. They are manifested in urinary tract infections, urinary malignancy, bladder calculi, overactive bladder, neurogenic bladder, radiation cystitis, interstitial cystitis, extravesicle pathology (pelvic mass), distal ureteral calculi, and urinary retention. In males, the most common etiology of urinary urgency is bladder outlet obstruction from B.P.H. Measure voided volume and measure residual volume with the BladderScan[®] to diagnose urinary retention, the only etiology requiring catheterization.

This syndrome comprises a group of patients, both male and female, who suffer from urinary urgency and urinary frequency. In the past, it was used to refer to patients with urinary urge incontinence. More recently, the term has expanded into a paradigm for describing patients who not only have incontinence as a manifestation of overactive bladder, but also suffer severe urinary frequency and urgency. The BladderScan[®] is clinically applicable not only in evaluating patients with incontinence from retention (thus differentiating their condition from urge incontinence), but also in acting as a behavioral feedback data mechanism to facilitate the modification of voiding behavior.

Voiding Trials:

Monitoring the success of voiding requires keeping solid documentation of voided volumes, the times the patient voided, and residual urine volumes. A voiding record that includes this information should be kept. Residual volume can be noninvasively measured using the BladderScan[®].

The decision to re-introduce a urinary catheter should be made based upon symptoms of pain or persistent high residual urinary volumes.

Painful Voiding Syndrome:

This condition represents many possible pathological diagnoses. Its main feature is pain with urine storage. It may indicate acute or chronic cystitis (i.e., bladder infection), carcinoma in situ, transitional cell cancer of the bladder or other malignancy, radiation cystitis, chemical cystitis, urinary retention, or interstitial cystitis.

BladderScan[®] use is indicated to evaluate bladder volume and diagnose urinary retention.

Assessment of Bladder Volume in Establishing a Voiding Schedule:

Patients with the symptoms of overactive bladder from neurogenic or non-neurogenic causes, and patients with some types of urinary incontinence, may benefit when placed on timed voiding schedules. Patients on such schedules will void at predetermined times, rather than by sensation or necessity. The BladderScan[®] is an excellent, noninvasive tool for determining bladder volume when establishing a voiding schedule.