DIAGNOSTIC CHALLENGE

# Pipeline Problems

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As a GP working in PEI, a worried mother presents with her 2 month old son, who has had a fever for a few days. Work-up reveals a urinary tract infection, which clears after a short course of antibiotics. A voiding cystourethrogram is performed at the local hospital. Below is a selected image from the series. The plain abdominal film (not shown) revealed no abnormalities.

*Figure 1. VCUG*

**Q1: Describe the findings on this film.**
**Q2: Can you give a differential diagnosis?**
**Q3: What test(s) are now appropriate?**

## DIAGNOSTIC CHALLENGE - ANSWERS

**A1:** The bladder is distended and filled with contrast material. A catheter is seen in the urethra. A round filling defect is seen at the bladder base on the right side. No reflux of contrast material is seen into the ureters. The rest of the film is within normal limits.

**A2:** Considerations for a finding such as this would include: ureterocele, rhabdomyosarcoma, and a focal area of cystitis.

**A3:** A nuclear imaging renal scan to assess function of the kidneys as well as ultrasound of the bladder and kidneys to look at structural abnormalities should be performed. **Figure 2** shows selected images from a renal scan taken at 4, 12, 20, and 28 minutes. The images obtained are viewed posteriorly. The right kidney shows delayed uptake of radiopharmaceutical. The upper pole of the right shows negligible uptake. **Figure 3** is an ultrasound showing a transverse view of the bladder. There is a fluid-filled structure within the bladder and its wall is shown at the solid white arrow. To the right is a dilated ureter (open arrow). Ultrasound of the kidneys revealed bilateral hydronephrosis (not shown).

**Q4: Does this change your differential diagnosis?**

**Q5: What do the results of the renal scan mean, in terms of patient management?**

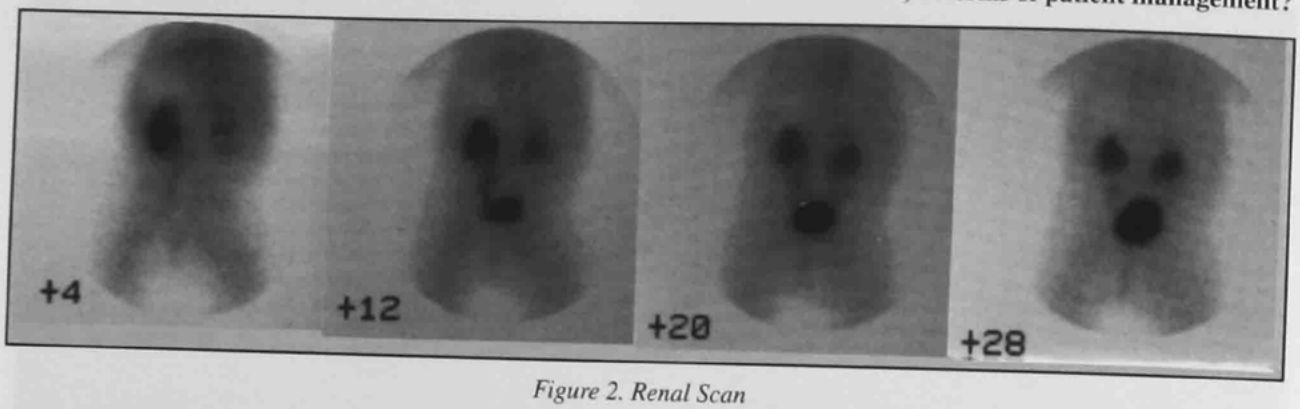



*Figure 2. Renal Scan*

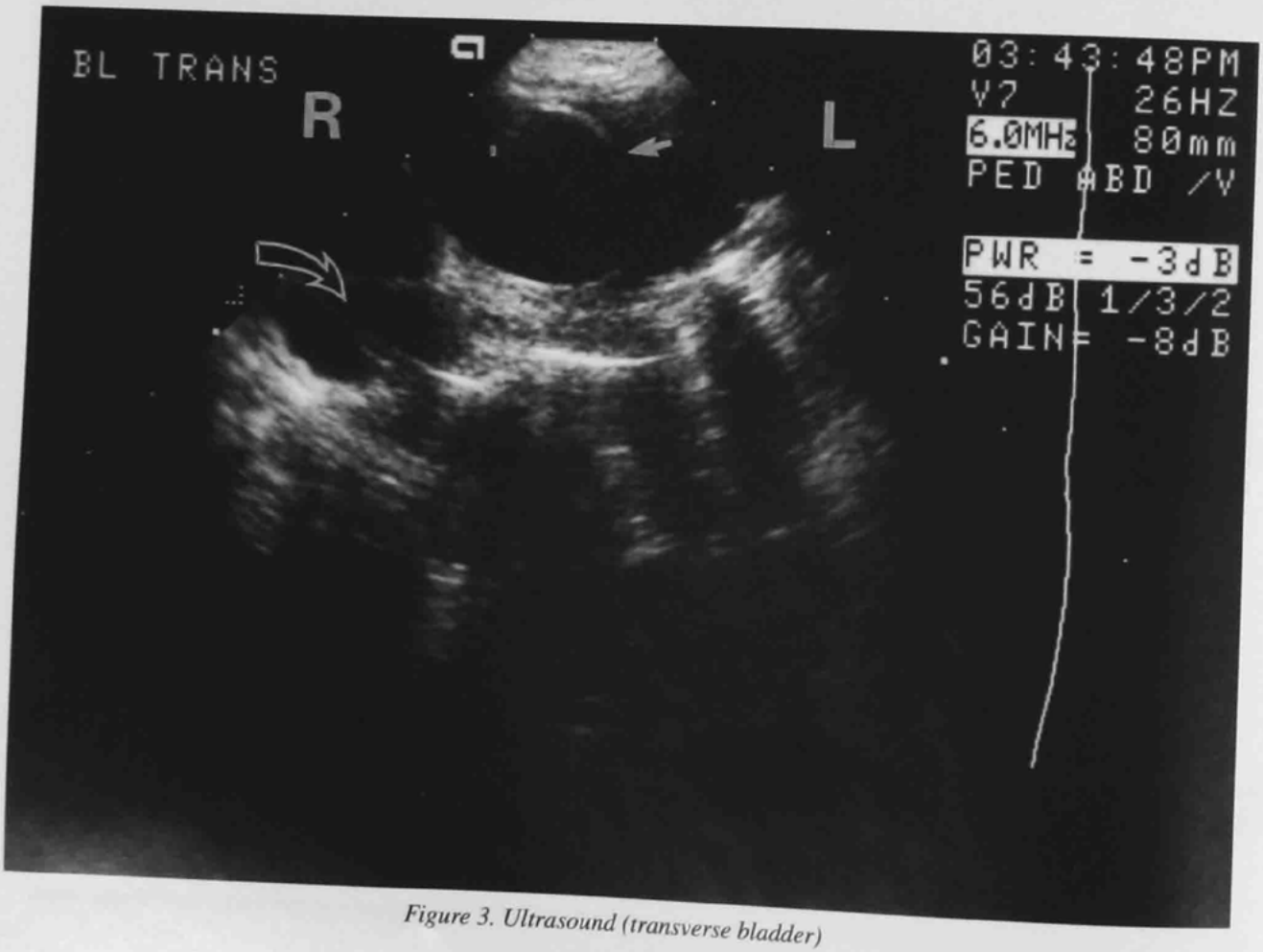
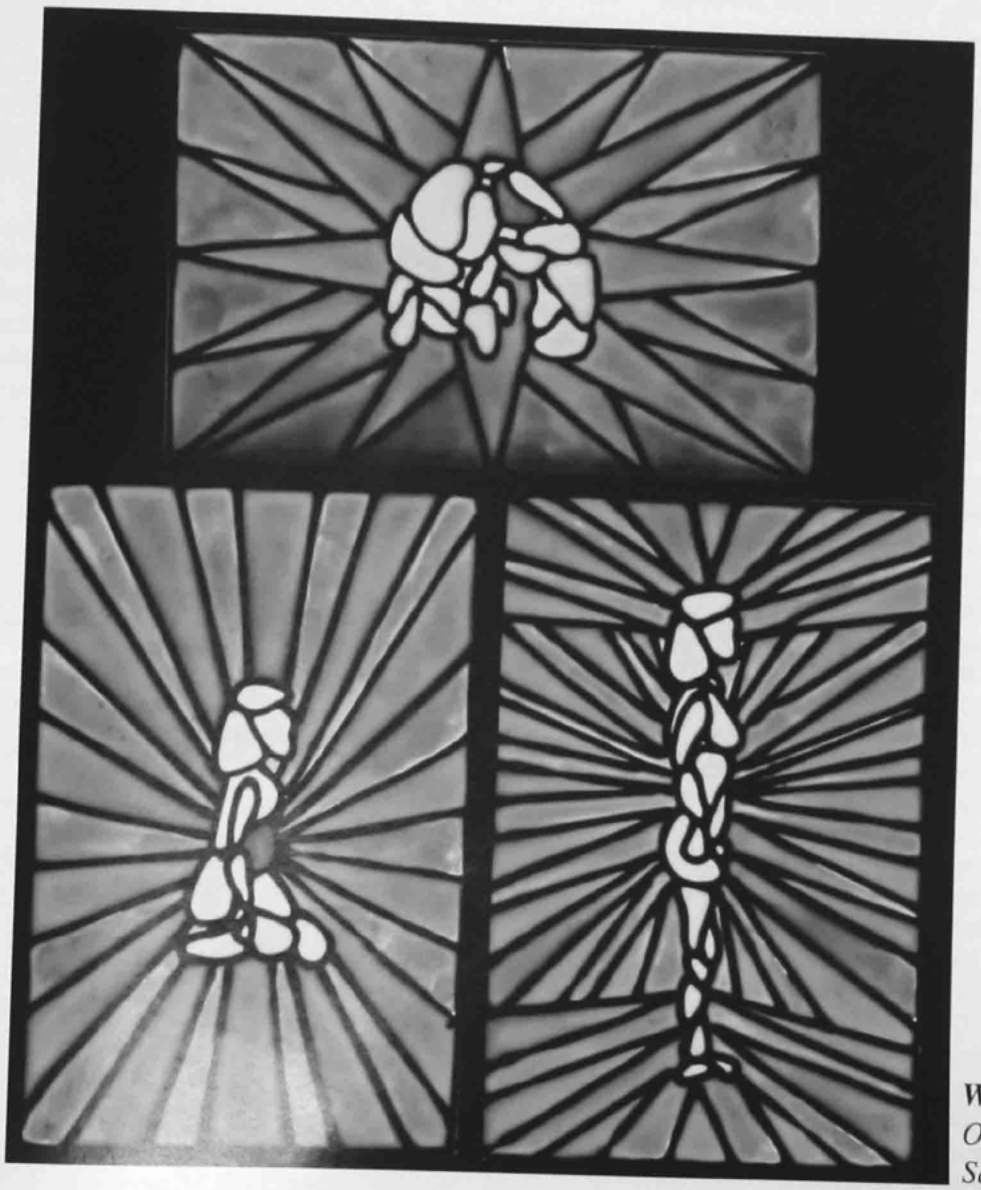



*Figure 3. Ultrasound (transverse bladder)*

# Twenty-one Medical Students Explore **Transplantation** Through Art

On May 19, twenty-one medical students mounted an exhibtion of their art, inspired by the issues surrounding transplantation. Below is just one of the pieces shown. If you would like more information about this project, contact Jonah Samson, Med I, at JSAMSON@tupmcms1.med.dal.ca.



***Waiting***
*Oil on glass*
*Sandya Satyanarayana*

# Diagnosis: Ectopic Ureterocele

**A4:** Ureteroceles are congenital cystic dilations of the terminal or intramucosal segment of the ureter (1-4). They can be simple (intravesical) or ectopic in which case some portion of the ureterocele is located permanently at the bladder neck or in the urethra (1-3). Simple ureteroceles are less common than ectopic ureteroceles. They occur equally in both sexes and can occur at any age. However, they are usually seen in adults. They are generally associated with a single urinary system but when associated with a duplex system, it is usually with the upper pole ureter (1). Ectopic ureteroceles occur more frequently in children and are 4 to 7 times more common in females than males. They are often associated with ectopic ureters (60%) and renal duplications (80%) in which case they are generally associated with the upper pole ureter (2). Ectopic ureteroceles frequently occur bilaterally (1). In either type of ureterocele the upper pole ureter more commonly obstructed while reflux is more likely in the lower pole ureter (4). The Weigert-Meyer rule of ectopic ureters in duplicated systems states that the upper pole ureter inserts medially and caudally to the lower pole ureter (1).

One theory for the etiology of ureteroceles is based on Chwalla's membrane, which is a two cell layer present at the time of ureteral bud formation from the mesonephric duct (2). Chwalla suggested that delayed or incomplete breakdown of this membrane causes an obstruction leading to the formation of ureteroceles (2). This theory can be used to explain the fact that the majority of ureteroceles are stenotic.

Ureteroceles most commonly present as a urinary tract infection in the first few months of life (2). In an obstructed system the patient may become septic. Ten percent of patients present with a palpable abdominal mass (4). Actual prolapse of the bladder into the introitus occurs in 5% to 10% of girls (4). Ureteroceles are increasingly detected on antenatal maternal ultrasound (2). This is the ideal since it allows postnatal urinary prophylaxis and appropriate investigations to be organised. Additional features of ureterocele can include dribbling of urine and urinary retention due to bladder outlet obstruction (1).

The initial diagnostic procedure for children with urinary symptoms differs between males and females. All children will have an ultrasound of the bladder and kidneys. On ultrasound ureteroceles appear as a "cyst within a cyst" of the bladder (1). If the ureterocele is large enough it may be mistaken for the bladder itself. Ultrasound is also utilised to determine the presence of hydronephrosis and hydroureter (1). In addition to the ultrasound, males will have voiding cystourethrogram (VCUG) with fluoroscopy whereas females have VCUG with nuclear medicine. VCUG may show reflux and possibly even eversion of the ureterocele during urination (1).

**A5:** Renal scans aid in the estimation of renal function (1) which will determine the appropriate treatment of the ureterocele.A patient with a non-functioning renal segment (usually a non-functioning upper pole) or with very poor function may benefit from a heminephrectomy.

The goals of ureterocele treatment include controlling infection, preventing vesicoureteral reflux, preserving renal function and maintaining continence (1-2). Management of ureteroceles should be individualised to each patient. Aggressive management of the septic patient initially involves percutaneous drainage of the infected system (2). Subsequent interventions depend on the particular patient. Infants are often treated with endoscopic incision of the ureterocele (1-2) since the tiny size of the patient makes more extensive surgery very challenging. As well, this procedure often proves to be the only intervention required. Other options for treatment include heminephrectomy and ureterectomy, excision of the ureterocele, vesicle reconstruction and ureteral reimplantation (1-2).

The patient in this case underwent cystoscopy and decompression with transurethral incision of the ureterocele. The procedure was successful and renal function improved. The patient was discharged home on prophylactic antibiotics. At age 2 years, the child underwent a right-sided heminephrectomy of the non-functioning upper pole and ureterectomy due to his chronic bladder infections. Since this procedure he has continued to do well.

## REFERENCES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