

# Chapter 12

## Abdominal Pain: Urological Aspects



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### Key Points

- Abdominal pain is a common symptom in pediatric practice.
- Different pathologies may cause abdominal pain including a number of urological conditions.
- It is relevant to have these possible conditions in mind when studying pediatric patients.
- This chapter will review some of these pathologies and their initial management.

### Introduction

Abdominal pain is one of the most common symptoms in pediatric practice. Aetiologies behind it are multiple; a number of urological conditions present themselves with abdominal pain that may be classified as follows:

- (a) Obstructive
- (b) Non obstructive pathologies: infectious diseases, malignancies and gynecological conditions

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105

## ***Obstructive Urological Pathologies***

1. The most classical of them all is undoubtedly urolithiasis. Nevertheless, the classical acute abdominal or flank pain that characterizes this pathology in adults occurs in only 50% of children. Preschool children are rather asymptomatic and are usually diagnosed after a UTI. Other clinical manifestations are haematuria, dysuria and/or urinary frequency. Evaluation of these patients include a complete clinical history with emphasis on dietary habits, metabolic evaluation and, ideally, stone analysis. Diagnosis in children is generally achieved with ultrasound, which may detect stones at the renal pelvis, ureteropelvic junction, proximal and distal ureter; nonetheless, it does not visualize stones at the mid ureter. Signs due to obstruction may suggest the presence of urolithiasis. In older patients plain abdominal X-ray may be diagnostic. Non enhanced abdominal computed tomography is the gold standard in the diagnosis of this pathology, although a relevant issue in children is the possible risk of accumulated radiation exposure. Therapeutic alternatives are multiple; expectant approach, extracorporeal shockwave lithotripsy and surgery. In turn, surgery offers various approaches, especially minimally invasive surgery with endourologic procedures such as ureteroscopy, percutaneous nephrolithotomy and laparoscopic procedures.

	Population	Prime symptoms	Initial approach
Kidney stones	More frequent in smaller children	Unspecific, recurrent abdominal and flank pain	Initial study of these patients should include urine analysis and an ultrasound. If US is positive, metabolic study <sup>a</sup> is the next step
Ureteral stones	More frequent in school age and adolescents	Acute flank pain and haematuria	
Distal ureteral stones and bladder stones	More frequent in adolescents	Acute abdominal and flank pain, haematuria and dysuria	

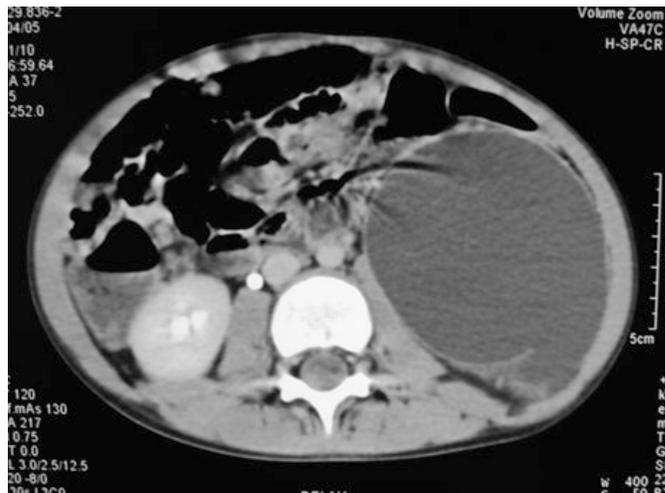
<sup>a</sup>Metabolic study: 24 h excretion of calcium, uric acid, oxalate, citrate, cysteine and sodium

Patients with calculi passed or retrieved, patients with non – glomerular haematuria and dysuria with abdominal / flank pain and patients with abdominal or flank pain without other symptoms but with positive family history or urolithiasis should be studied with an ultrasound. Patients with positive ultrasound should be referred and undergo metabolic study, specific imaging when necessary and specific treatment. Patients with ultrasound that does not identify a stone but describes urinary obstruction will need further imaging. Patients with a negative ultrasound but high suspicion of lithiasis either because of family history or urinary symptoms should also be referred. Ultrasound should be repeated in a couple of months and probably will end in metabolic study too (Figs. 12.1, 12.2, 12.3, 12.4, 12.5, and 12.6).

**Fig. 12.1** Palpable abdominal mass in a 4 year old patient, who is studied for abdominal pain and constipation



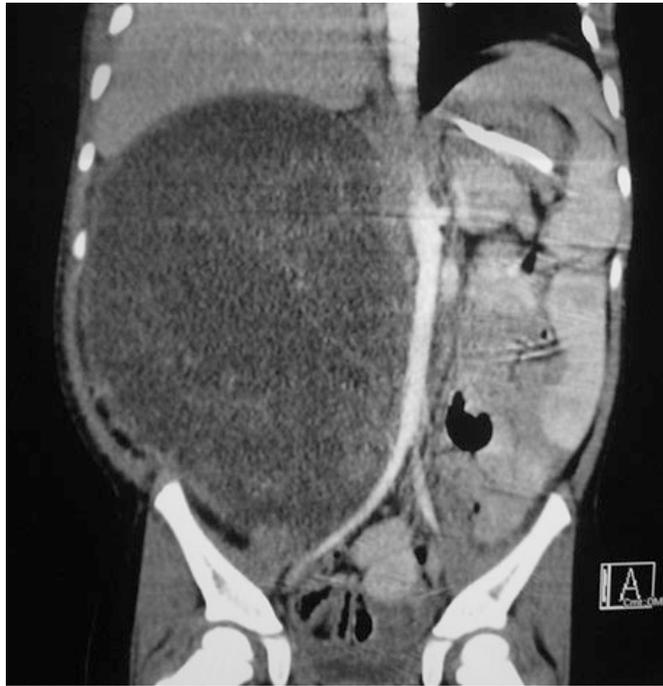
**Fig. 12.2** Abdominal CT from same boy showing important mass with no renal tissue observed: diagnosis of Right PUJ obstruction



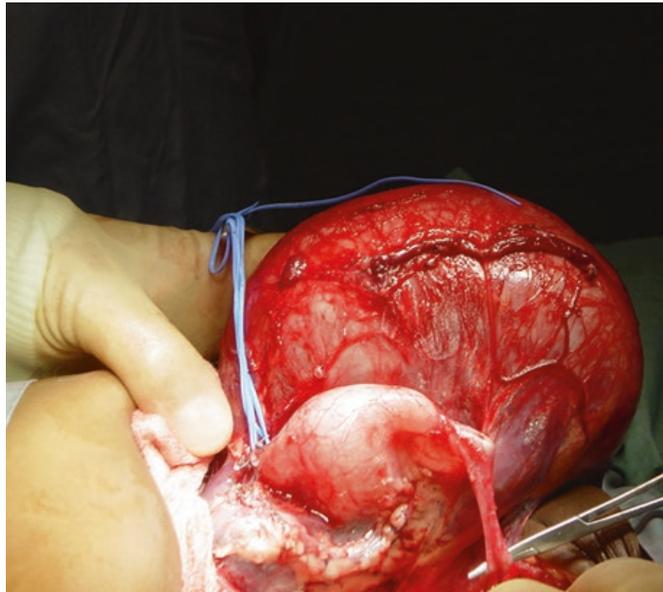
**Fig. 12.3** Urolithiasis: multiple radio opaque stones in both kidneys



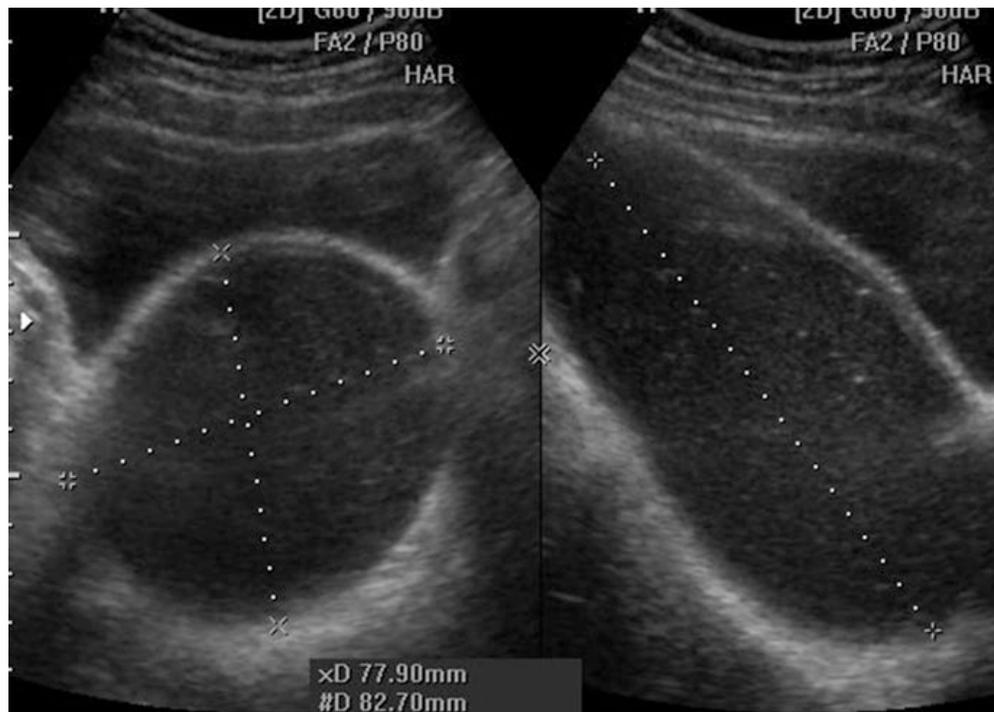
**Fig. 12.4** MRI: Large heterogeneous mass at the right flank showing a kidney tumour



**Fig. 12.5** Same Wilm's Tumour from Fig. 12.4 at surgery



2. Pelvicureteric junction (PUJ) obstruction is the most common congenital urinary obstruction. Before the spread of prenatal diagnosis the most common presenting symptom in patients with PUJ obstruction was abdominal pain and abdominal mass followed by UTI and haematuria. Nowadays, most patients with PUJ are diagnosed prenatally and are studied and “solved – operated?” before they present symptoms. Initial study should include ultrasonography, which may show the dilation caused by the PUJ obstruction, evaluate renal parenchyma



**Fig. 12.6** Ultrasound: Hypoechoic fluid content distending the uterus and vagina

thickness, and suggest if renal dysplasia exists. Dynamic renal scintigraphy is very useful in the assessment of possibly obstructed kidneys. Some of these obstructions are non-progressive and asymptomatic making relevant the need to determine which kidneys will require a surgical management. Also, in these patients, you should not discard concomitant problems like vesicoureteral reflux or urinary stone disease, especially in adolescents. The surgical repair consists of a pyeloplasty either open or laparoscopically approached, which has a high rate of success and a low rate of complications.

3. The wide ureter or megaureter is caused by either obstruction or reflux occurring at the ureterovesical junction. They can be classified in primary, ureteral defects, and secondary, defects whose “cause” is extraureteral. Megaureters, especially primary ones, generally are suspected in prenatal ultrasound. Retrovesical ureteric diameter  $\geq 7$  mm from 30 weeks gestation onwards is considered abnormal and should be followed after birth. Until definitive diagnosis is made it is advisable to start antibiotic prophylaxis at least during the first 6 months. Postnatal diagnosis is usually made while studying a patient with UTI, haematuria, abdominal mass or cyclic abdominal pain. Work up must include ultrasound, voiding cystourethrogram, dynamic nuclear renography and, in specific cases, cystoscopy. Bladder outlet obstruction and vesicoureteral reflux should be studied and excluded in these patients. When anatomy is unclear, an enhanced computed tomography should be requested in order to determine the specific cause of the wide ureter and plan the appropriate surgical approach.

4. Urinary tract obstructions at other levels, such as bladder outlet and urethra, have different clinical manifestations. They may sometimes include abdominal pain but clearly not as a prime symptom.

### ***Non-obstructive Urological Pathologies***

1. Urinary tract infections are the most prevalent bacterial disease during the first 3 months of life and accounts for almost 10% of febrile episodes in infants. Clinical presentation is variable and very nonspecific, especially considering age, gender, pathogen and associated anatomical malformations. Pyelonephritis is generally characterized by fever, abdominal and or flank pain, dysuria, frequency and haematuria. Symptoms of peritoneal irritation may be present. Lower urinary tract symptoms include dysuria, frequency, urgency, haematuria and abdominal/suprapubic pain. Diagnosis is made with a properly obtained urine specimen; an ultrasound during the acute phase is very useful in confirming diagnosis and identifying an obstructive uropathy. Eventually a DMSA is useful demonstrating acute pyelonephritis and secondary scarring.
2. Renal tumours also may present with abdominal pain. The most common primary malignant renal tumour of childhood is Wilm's tumour and the most common benign solid tumour is mesoblastic nephroma. Generally renal tumour presentation is through palpable abdominal mass. Additional findings include abdominal pain, haematuria, and sometimes pyelonephritis among others. Diagnostic evaluation should include routine laboratory tests, tumour markers, imageneologic studies for accurate staging and in search for metastasis. These patients should be referred to the specialist as soon as possible.
3. Symptoms that may lead you to suspect vesico ureteric reflux (VUR) in a paediatric patient are generally related to urinary tract infections. In newborns and pre-school patients symptoms are vague such as irritability, failure to thrive, poor feeding, vomiting and fever. Classic presentation occurs in older children. In this group, patients with VUR and UTI present abdominal pain as a prime symptom. VUR is an important risk factor for febrile UTI's and renal scarring so it is important to consider it while evaluating patients with abdominal pain and urinary tract infection.
4. Considering the intraabdominal location of the female reproductive tract, different gynecological conditions should be considered as possible aetiologies of abdominal pain. A characteristic example is ovarian masses, especially ovarian torsion. Abdominal pain, nausea, vomiting and palpable abdominal mass is the classical presentation of ovarian torsion, whose diagnosis still remains as one of exclusion. None of the actual imaging studies is definitive in the diagnosis, although ultrasound is useful. The best diagnostic modality in ovarian torsion is laparoscopy; it is also the treatment of choice.
5. Finally, multiple genital anomalies may include abdominal pain as a presenting symptom. Congenital vaginal obstruction as a result of an incomplete canaliza-

tion of the vagina is a diagnosis to consider. An imperforate hymen can result in hydrocolpos, distension of the vagina, and sometimes with distension of the vagina and uterus, known as hydrometrocolpos. These patients are usually diagnosed at newborn age with a palpable lower abdominal mass, urinary tract obstruction, and abdominal pain. If no abdominal mass is present at birth, these patients may remain asymptomatic until adolescence when they present amenorrhea, cyclic abdominal pain and abdominal mass (hematometrocolpos). All these patients should be referred promptly to the specialist.

## Indications for Referral

- (a) Abdominal pain with urinary tract dilatation at any level.
- (b) Urinary tract infection diagnosed during evaluation of a patient with abdominal pain.
- (c) Patients with urolithiasis.
- (d) Renal mass, ovarian mass and/or pelvic mass, which may present with abdominal pain.
- (e) Pelvicureteric junction obstruction ideally at an early age when prenatal diagnosis has been made. In older children it should be considered in patients with pain and/or with abdominal mass.

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