

# HYDRONEPHROSIS & VESICoureTERAL REFLUX

Dept. Of Surgery

## HYDRONEPHROSIS

- A 32 - year - old pregnant woman presents to the ER with right sided flank pain. Renal US shows right hydronephrosis.

**What is the differential diagnosis?**

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- Physiologic hydronephrosis.
- Dilation of the upper urinary tracts occurs by the 7th week of gestation and may persist for 6 weeks postpartum.
- Results from both hormonal and mechanical factors.
- Ureteral dilation is more pronounced on the right side because of dextrorotation of the uterus, whereas the left ureter is more protected from compression by the gas filled sigmoid colon.

- ## How is this managed?

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- Analgesia
- Positioning the patient on her left side.
- Ureteral stent or nephrostomy tube

- The flank pain resolves with conservative measures and you see the patient in clinic 2 weeks later. Her urinalysis (UA) shows bacteriuria, but she is asymptomatic.

## Should this be treated?

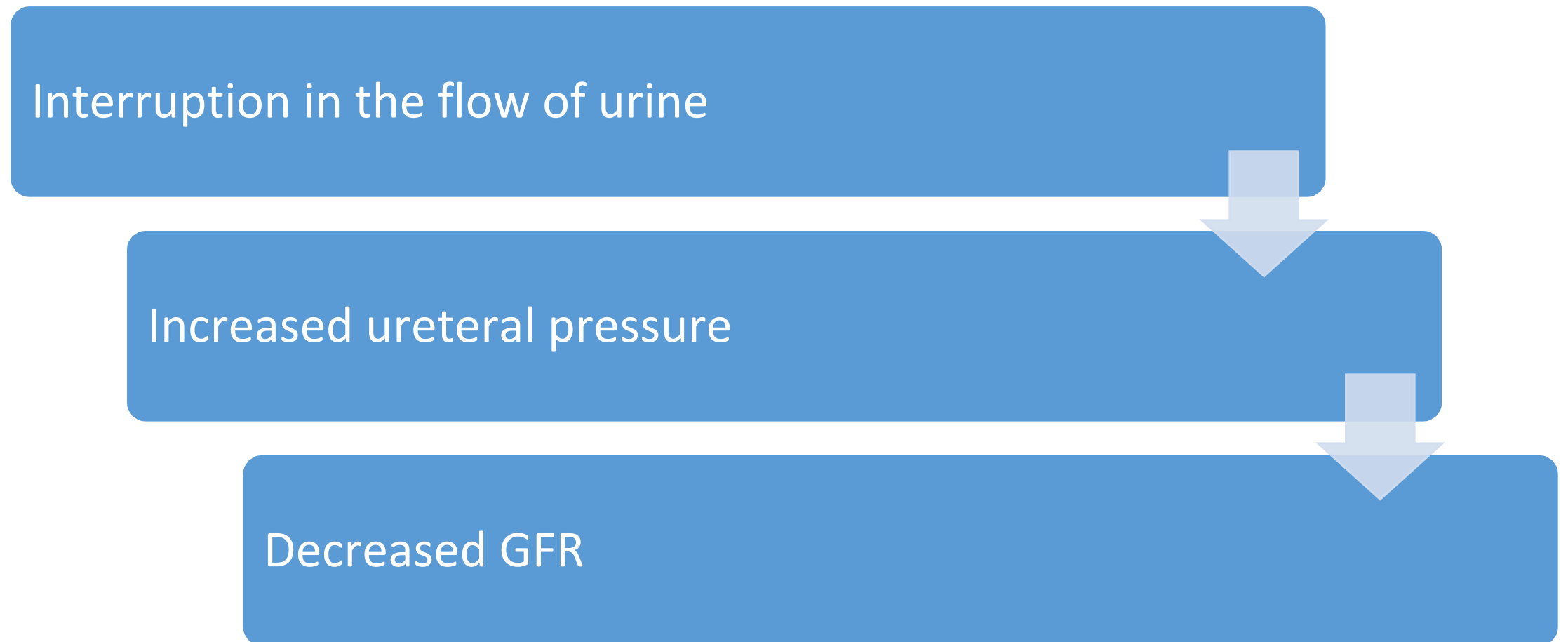
# Should this be treated?

- Because of the risk of acute pyelonephritis.
- The rate of progression of asymptomatic bacteriuria to symptomatic infection is 3 - 4 times higher during pregnancy.

## Introduction

- Common clinical condition.
- Defined as distention of the renal calyces and pelvis with urine as a result of obstruction of the outflow of urine.
- Can be physiologic or pathologic, acute or chronic, unilateral or bilateral.
- Obstructive uropathy ?
- Functional or anatomic obstruction of urinary flow at any level of the urinary tract.
- Obstructive nephropathy ?
- When the obstruction causes functional or anatomic renal damage.

# Pathophysiology



- This decline of GFR can persist for weeks after relief of obstruction.
- Decreased function of the nephrons.
- The extent of functional insult is directly related to the duration and extent of the obstruction.
- Brief obstruction- reversible functional changes.
- Chronic obstruction - profound tubular atrophy and permanent nephron loss.

# Causes of U/L obstruction

- **Extramural obstruction**

- Tumour from adjacent structures, e.g. carcinoma of the cervix, prostate, rectum, colon or caecum
- Idiopathic retroperitoneal fibrosis
- Retrocaval ureter

- **Intramural obstruction**

- Congenital stenosis, PUJO
- Ureterocele and congenital small ureteric orifice
- Stricture
- Neoplasm of the ureter or bladder cancer involving the ureteric orifice

- **Intraluminal obstruction**

- Calculus in the pelvis or ureter
- Sloughed papilla in papillary necrosis due to?-----

## Causes of B/L Hydronephrosis

- **congenital:**

- posterior urethral valves;
- urethral atresia;

- **acquired:**

- benign prostatic enlargement or carcinoma of the prostate;
- postoperative bladder neck scarring;
- urethral stricture;
- phimosis.



# Clinical features

- Mild pain or dull aching in the loin.
- Palpable kidney
- New onset HTN
- Recurrent UTIs
- Attacks of acute renal colic may occur with no palpable swelling.
- Intermittent hydronephrosis (Dietl's crisis).

A swelling in the loin is associated with acute renal pain. Some hours later the pain is relieved and the swelling disappears when a large volume of urine is passed.

# Investigations

- urine analysis
- Assessment of renal function
- USG
- Colour Doppler USG
- CT urography
- MR urography
- IVP
- Retrograde pyelography
- Isotope renography
- Very occasionally, a Whitaker test is indicated. A percutaneous puncture of the kidney is made through the loin and fluid is infused at a constant rate with monitoring of intrapelvic pressure.

# Treatment

1. Pain management.
2. Renal drainage – stenting/nephrostomy – why?
3. Treat the cause
4. Anderson-Hynes pyeloplasty.
5. Endoscopic pyelolysis

# VESICOURETERAL REFLUX

# INTRODUCTION

- Characterized by the retrograde flow of urine from the bladder to the kidneys.
- VUR may be associated with (UTI), HDN and abnormal kidney development (renal dysplasia).
- Increased risk for pyelonephritis, hypertension, and progressive renal failure.
- Early diagnosis and vigilant monitoring of VUR are the cornerstones of management.

# CAUSES

## ☐ **Primary causes**

- Short or absent intravesical ureter
- Absence of adequate detrusor backing
- Lateral displacement of the ureteral orifice
- Paraureteral (Hutch) diverticulum

## ☐ **Secondary causes**

- Cystitis or UTI
- Bladder outlet obstruction
- Neurogenic bladder
- Detrusor instability

# Pathophysiology

- Ureter inserts into the trigone.
- The intramural portion of the ureter courses into the bladder wall at an oblique angle.
- This intramural tunnel length-to-ureteral diameter ratio is 5:1.
- As the bladder fills with urine and the bladder wall distends and thins, the intramural portion of the ureter also stretches, thins out, and becomes compressed against the detrusor backing.
- This functions as a flap-valve mechanism and prevents urinary reflux.

# Pathophysiology

- A short intramural tunnel results in a malfunctioning flap-valve mechanism and VUR.
- Reflux of infected urine is responsible for the renal damage.
- bacterial endotoxins leads to release of oxygen free radicals.
- These oxygen free radicals result in fibrosis and scarring of the affected renal parenchyma.

# Clinical features

- No specific signs or symptoms unless complicated by UTI.
- LUTS.
- Palpable kidney.
- New onset HTN.
- Renal failure.

# Workup VUR

## Lab studies

- Urinalysis and urine culture.
- RFT.
- Serum electrolytes

## Imaging studies

- VCUG/radionuclear cystourethorography
- USG
- Nuclear scan
- Urodynamic studies
- Cystoscopy

# Treatment

- Medical treatment
- Surgical treatment
- Surveillance

# Medical management

- Administering long-term suppressive antibiotics
- Correcting the underlying voiding dysfunction (if present)
- Conducting follow-up radiographic studies (eg, VCUG, nuclear cystography, DMSA scan) at regular intervals

# Surgical treatment

- Grade III or more reflux.
- Failure of medical management.
- Ureteral reimplantation
- Endoscopic treatment:
  - The principle of the procedure is to inject, under cystoscopic guidance, a biocompatible bulking agent underneath the intravesical portion of the ureter in a submucosal location.
  - The bulking agent elevates the ureteral orifice and distal ureter in such a way that the lumen is narrowed, preventing regurgitation of urine up the ureter but still allowing its antegrade flow.



A 50 year old female is admitted with abdominal pain and anuria. Radiological studies reveal bilateral impacted ureteric stones with hydronephrosis. Urine analysis showed RBCs with pus cells in urine. Serum creatinine level was 16 mg / dl and blood urea level was 200 mmol/L; which of the following should be the immediate treatment.

- a. Lithotripsy
- b. Ureteroscopic removal of stones
- c. 'J' stent drainage
- d. Hemodialysis

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