

ACUTE KIDNEY INJURY... FOCUS ON OBSTETRICS

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AIMS & OBJECTIVES

- * Review the functions of the kidney
- * Identify renal physiological changes in pregnancy
- * Define Acute Kidney Injury (AKI)
- * Look at general risk factors for AKI
- * Raise awareness of additional risk factors for AKI in pregnancy
- * Identify the 3 groups of kidney injury
- * Understand appropriate fluid management

So... what are the kidneys?

- * The kidneys are 2 bean shaped organs, each about the size of a fist
- * They are located just below the rib cage, one on each side of the spine



FUNCTIONS OF THE KIDNEY

- **Urine production**
- **Removal of waste products**
- **Maintenance of fluid balance**
- **Maintenance of electrolytes**
- **Regulation of acid base balance**
- **Production of erythropoetin**
- **Production of renin**
- **Vitamin D₃ synthesis**

Functional changes in pregnancy..

- * **Kidneys increase in size by up to 2cm**
- * **Ureters dilate**
- * **Increased renal blood flow due to increased cardiac output and renal vasodilatation**
- * **Decrease in systolic pressure due to vasodilatation and reduced vascular resistance**
- * **Increased renal blood flow leads to increased glomerular filtration rate (GFR), begins shortly after conception, peaks at beginning of 2nd trimester and remains until after delivery**

Acute Kidney Injury....

Abrupt reduction in kidney function (within 48hrs) & encompasses a wide spectrum of injury to the kidneys, not just kidney failure.

NICE (2013)



Acute kidney injury

- Seen in 13-18% of all people admitted to hospital
- Older adults particularly at risk
- £434M - £630M per year to NHS, Excluding Community
- More than breast, lung and skin cancer altogether
- Suboptimal care contributing factor
- NCEPOD (2009) 50% received good care
- Failures in prevention, recognition, therapy and timely referral to specialist services.
- NICE Guidance (2013), reviewed 2017.

NICE RECOMMENDATIONS

- Assess Risk
- Prevent AKI
- Detect AKI
- Identify Cause
- Manage AKI
- Information and support

Prevention is
better than
cure....



AKI Risk factors

General

- * > 65 years
- * Chronic kidney disease
- * History of AKI
- * Patients having surgery
- * Nephrotoxic drugs
- * Liver failure
- * EWS Deterioration
- * Hypovolaemia

Pregnancy

- * Gestational diabetes
- * Sepsis
- * C Section
- * Pre eclampsia
- * Hyperemesis gravidarum
- * Maternal haemorrhage

Clinical Features of AKI

- **Asymptomatic**
- **Oliguria**
- **Deranged bloods – Urea, creatinine, Potassium**
- **Confusion**
- **Nausea and vomiting**
- **Loss of appetite**

Urine output...

- * **Normal** urine output ranges from 1.5 – 2litres daily
- * **Oliguria** is defined as the production of between 100 – 400mls per 24hours
- * **Anuria** defined as the production of less than 100mls in 24hrs
- * **Absolute anuria** reflects no urine output and should be attributed to a urinary tract obstruction until ruled out

So.... What do your kidneys need

- * An adequate blood supply
- * Ability to function/filter
- * No obstruction between kidneys & urethra or urinary catheter



Causes of AKI....

- * **Pre – renal** Inadequate perfusion / blood flow
- * **Renal (intrinsic)** Have they kidneys suffered an insult or been poisoned?
- * **Post-renal** Obstruction to flow

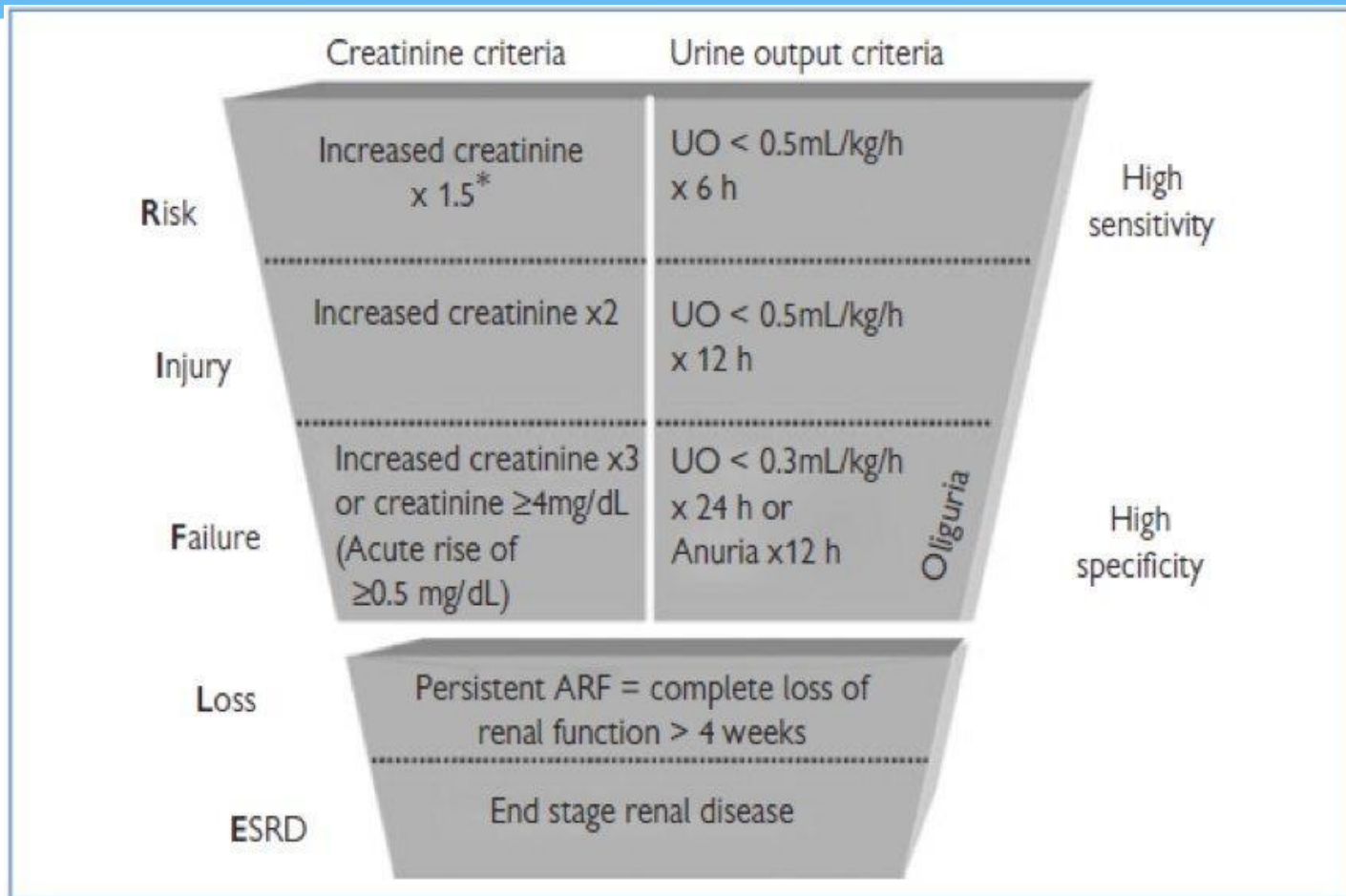
Oliguria in pre eclampsia

- * Pre eclampsia causes a decrease in glomerular filtration and renal blood flow
- * Vasospasm and glomerular capillary endothelial oedema – reduced functional glomeruli
- * \downarrow renal blood flow – protein losses from the vascular space & increased sensitivity to angiotensin II
- * Oliguria often detected in immediate postnatal period
- * At this point more at risk of pulmonary oedema
- * Cautious fluid restriction (1ml/kg/hr) / & strict input output monitoring

PREVENT AKI

- Monitor bloods
- Review drugs – e prescribing
- Track and trigger system (NEWS / NEWS 2) with **accurate** fluid balance
- Iodinated contrast – fluids (? acetyl cystine)

Detect AKI



IDENTIFY CAUSE

- **URINALYSIS** – ASAP document results and think early referral to Nephrologist if no cause found of haematuria & proteinuria
- **USS** – Not routine if cause identified
- Within 6hrs if pyelonephritis suspected
- Within 24hrs if AKI and no identified cause

Complications from AKI – Increased mortality

- * Hyperkalaemia
- * Acidosis
- * Pulmonary oedema
- * Uraemic encephalopathy
- * Uraemic pericardial effusion
- * Uraemic GI Bleed

MANAGE AKI

- * Relieve obstruction
- * Pharmacological intervention – do not routinely offer loop diuretics
- * Refer for Renal Replacement therapy early –No response to medical management complications
- * Referral to nephrologist

CASE STUDY

- * You are called to assess a 39 year old lady on the antenatal ward. She is 38 weeks pregnant with a 4 day history of vomiting. She is complaining of a painful knee and asks if she can have her ibuprofen which is due now.
- * The midwives tell you she hasn't passed urine since admission 4 hours ago....

- * A - Patent and able to speak
- * B - RR 28, SpO₂ 94% on room air
- * C - HR 110, BP 90/65, CRT 4 secs
- * D - AVPU – Alert, Pupils normal, Blood Glucose 5.6
- * E - Swollen left knee, not hot to touch

CASE STUDY

- * What risk factors can you identify?
- * ABCDE
- * Fluid challenge & Fluid I/O
- * Bladder scan, ? Catheter
- * Review drug history
- * Review notes
- * Investigations..... which?
- * Monitor.... How?

Summary

- * The kidneys and adequate function are vital to maintain homeostasis
- * There are 3 categories of renal failure
- * Risk assessments can prevent AKI or pick up additional risk factors early preventing long term damage
- * Early referral to specialists is essential – improved outcomes
- * A multi disciplinary approach is required including pharmacists, medical staff , dieticians and GP's

ANY QUESTIONS?.....

