



SNS COLLEGE OF ALLIED HEALTH SCIENCES
SNS Kalvi Nagar, Coimbatore - 35 Affiliated to Dr MGR
Medical University, Chennai



DEPARTMENT OF CARDIO PULMONARY PERFUSION
CARE TECHNOLOGY

COURSE NAME :CARDIOPULMONARY BYPASS AND ITS COMPLICATIONS
STERILE TECHNIQUES AND SURGICAL ASEPSIS MAINTENANCE

III YEAR

UNIT : COMPLICATIONS DURING BYPASS

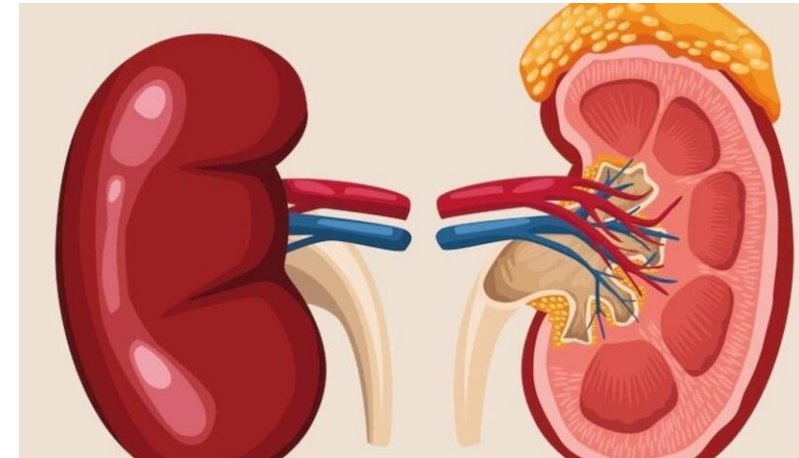
TOPIC : INADEQUATE URINE OUTPUT



INTRODUCTION



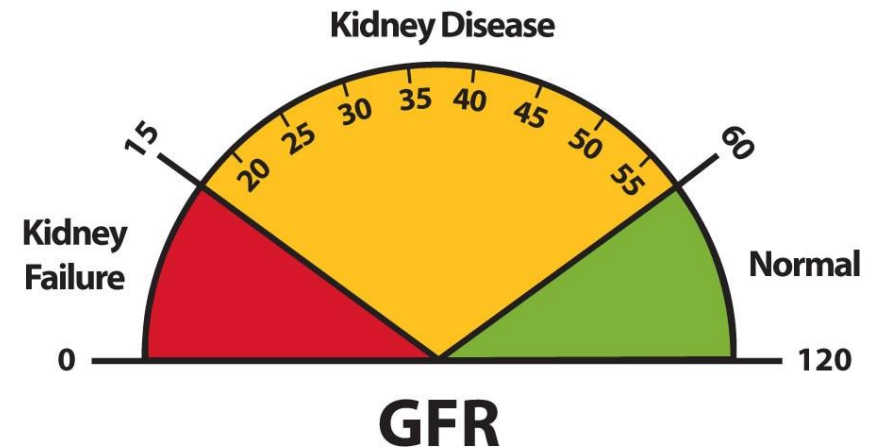
- Kidneys are the responsible organ for excretion of wastes in the body
- Kidneys are found in retroperitoneal region
- Cortex contain tubules and glomeruli Medulla contains tubules
- It receives 25% of cardiac output
- It needs adequate perfusion for regulation of water & solutes & controls BP
- Kidney dysfunction after bypass is a common occurrence





GFR AND NORMAL VALUES

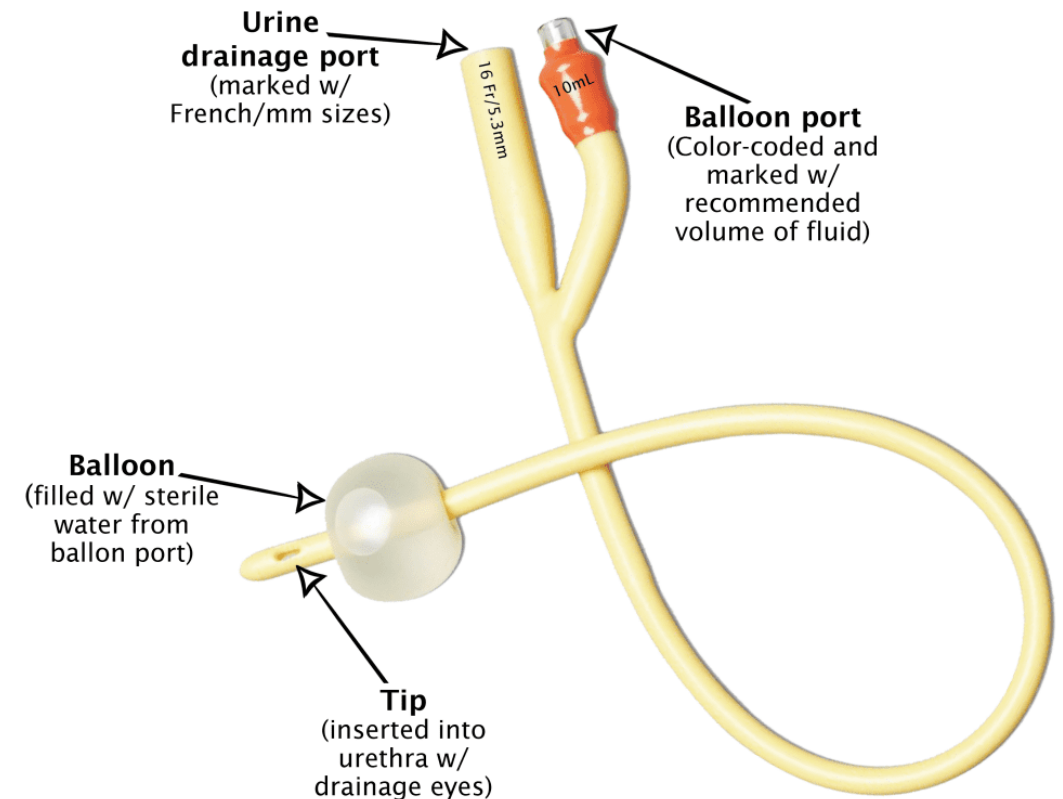
- GFR is the rate in which glomerulus permits passage of water, electrolyte & other small molecules but not blood cells and large proteins.
- Normal serum creatinine level = 0.6-1.2mg/dl
- Normal GFR = 90 – 120ml/min/1.73m²
- Normal urine output = 2L/day
- Blood K⁺ level = 3.6-5.2 millimoles. /L



CAUSES

Causes are majorly categorized into,

- During CPB procedures
- Catheter procedures
- Electrolyte imbalances

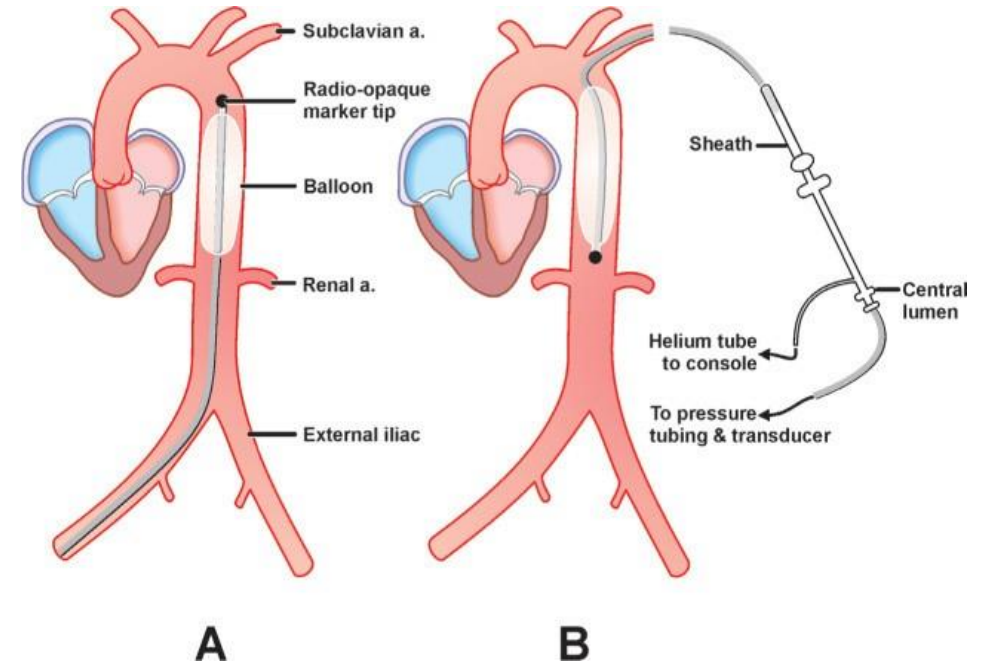




CAUSES FOR INADEQUATE URINE OUTPUT DURING BYPASS



- Renal hypoperfusion
- Excess anaesthesia leads to vasodilation
- Pre existing disease leads to oedema
- Increased length of circuit
- Prolonged bypass IABP usage in CPB
- Cerebral hypoperfusion
- Excessive albumin usage
- Usage of mis-matched blood transfusion
- Angiogram dye





INADEQUATE URINE OUTPUT DURING BYPASS – MANAGEMENT



- Increase the blood flow in order to attain 25% of CO to the kidney
- Limit the administration of anesthesia and Usage of vasoconstrictor drugs
- Administer diuretic drugs e.g. Mannitol
- Selection of circuit based on BSA
- Minimize the duration of bypass
- Place IABP balloon in 2cm above renal artery and 2cm below the subclavian artery
- Maintain an monitored the cerebral perfusion through EEG
- Minimal usage of albumin
- Appropriate donor's blood usage
- Pre op kidney function test
- Usage of hemoconcentration





CATHETER RELATED CAUSES



- Wrong placement of urinary catheter
- Kink in tubing
- Inappropriate size selection
- Improper balloon inflation
- Improper placement of drainage bag

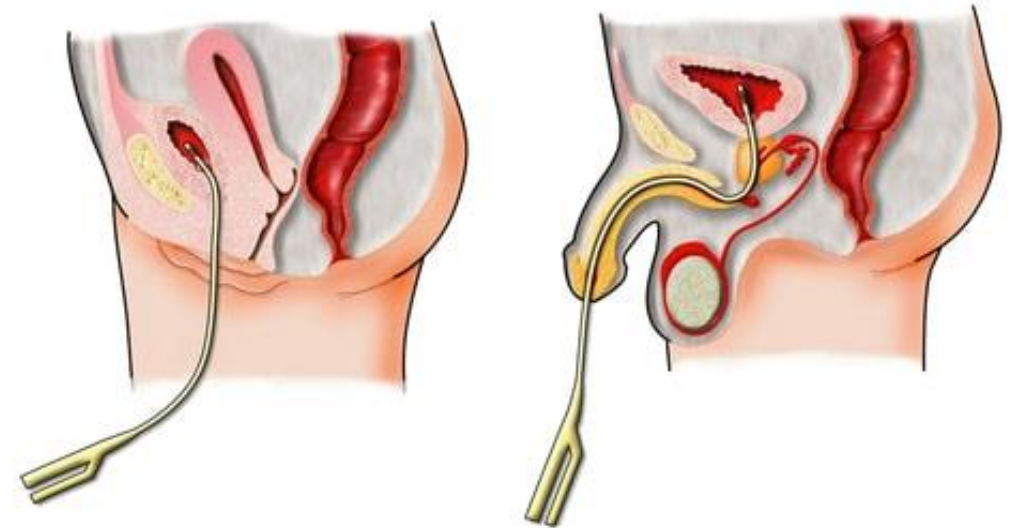




CATHETER RELATED CAUSES – MANAGEMENT



- Placement of urinary catheter in urethra region
- Place the patient in the bed in order to avoid kinking in tubing's
- Select the appropriate size of catheter based on BSA
- Proper balloon inflation
- Place the drainage bag below the hip level of the patient





ELECTROLYTE IMBALANCE



- Hyperkalaemia in AKI Pt's.
- Ca+(Ionized) level drops
- Hypomagnesemia
- Diabetic nephropathy

Electrolyte Normal Values

▪ Sodium	135 – 145 mEq/L
▪ Potassium	3.5 – 5 mEq/L
▪ Phosphrus	1.8-2.3 mEq/L
▪ Chloride	98 – 106 mEq/L
▪ Calcium	9 – 11 mEq/L
▪ Urea	20 – 40 mEq/L
▪ Creatinine	0.7 – 1.2 mEq/L
▪ Magnesium:	1.5 – 3 mEq/L
▪ CO ₂	22 – 26 mEq/L
▪ Bicarbonate	24-30 mEq/L



ELECTROLYTE CORRECTIONS



- K⁺ sparing diuretics eg : spironolactone
- Loop Diuretics e.g.: Furosemide (Lasix)
- Administer CaCl - before coming off bypass
- Administration of Albumin and citrated blood products
- Administer Insulin
- Angiotensin Converting Enzyme Inhibitors – e.g. Captopril
- Angiotensin Receptor Inhibitors – e.g. Losartan





REFERENCES

- Principles of Cardiopulmonary Bypass – Sunit Ghosh
- The Manual Of Clinical Perfusion –D.Mark Brown



THANK YOU