

- Discuss the pathophysiology process involved in renal failure
- Chronic kidney disease is initially described as diminished renal reserve or renal insufficiency, which may progress to renal failure. Initially, as renal tissue loses function, there are few noticeable abnormalities because the remaining tissue increases its performance (renal functional adaptation)

Decreased renal function interferes with the kidneys ability to maintain fluid and electrolyte homeostasis. The ability to concentrate urine declines early and is followed by decrease in ability to excrete excess phosphate, acid, and potassium. As renal failure is advanced, the ability to effectively dilute or concentrate urine is lost, thus, urine osmolality is usually fixed at about 300 to 320 mOsm/kg, close to that of plasma (275 to 295 mOsm/kg), and urinary volume does not respond readily to variations in water intake

Creatinine and urea

Plasma concentrations of creatinine and urea (which are highly dependent on glomerular filtration) begin a hyperbolic rise as glomerular filtration rate diminishes. These changes are minimal early on. When the GFR falls below $15 \text{ mL/min} / 1.73 \text{ m}^2$, creatinine and urea levels are high and are usually associated with systemic manifestations (uremia). Urea and

creatinine are not major contributors to the uremic symptoms; they are markers for many other substances that cause the symptoms.

Sodium and water

Despite a diminishing glomerular filtration rate, sodium and water balance is well maintained by increased fractional excretion of sodium in urine and a normal response to thirst. Thus, the plasma sodium concentration is typically normal, and hyponatremia is infrequent unless dietary intake of sodium or water is very restricted or excessive. Heart failure can occur due to sodium and water overload, particularly in patients with decreased cardiac reserve.

Potassium

For substances whose secretion is controlled mainly through distal nephron secretion e.g. potassium, renal adaptation usually maintains plasma levels at normal until renal failure is advanced or dietary potassium intake is excessive.

Calcium and phosphate

Abnormalities of calcium, phosphate, parathyroid hormone, and vitamin D metabolism can occur, as can renal osteodystrophy. Decreased renal production of calcitriol contributes to hypocalcemia. Decreased renal excretion of phosphate results in hyperphosphatemia.

Secondary hyperparathyroidism is common and can develop in renal failure before abnormalities in calcium or phosphate concentrations occur. For this reason, monitoring PTH in patients with moderate chronic kidney disease even before hyperphosphatemia occurs, has been recommended.

Anemia

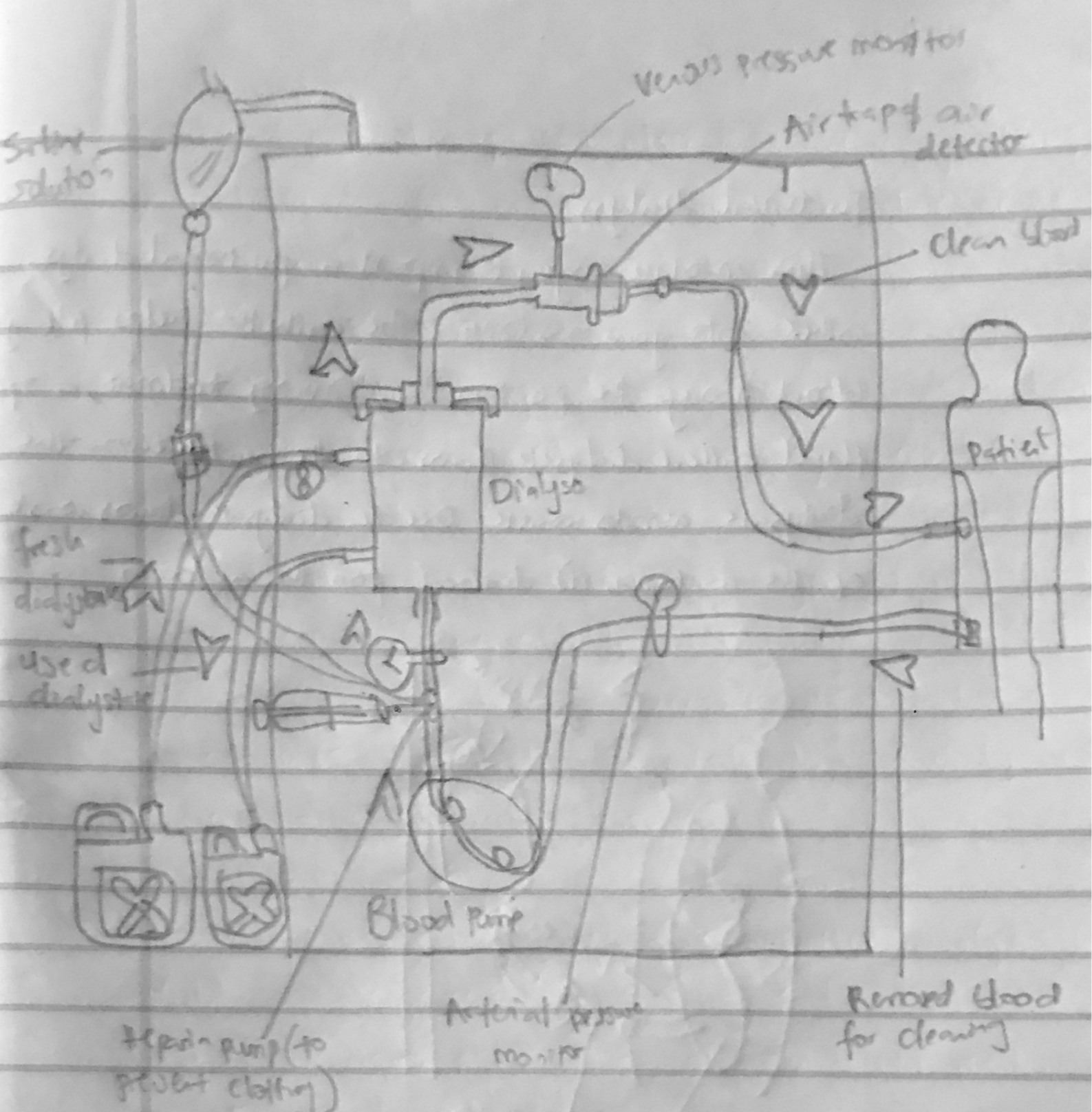
Anemia is characteristic of moderate to advanced CKD. The anemia of CKD is normochromic-normocytic. It is usually caused by deficient erythropoietin production due to a reduction of functional renal mass.

With the aid of suitable diagrams discuss the type of dialysis you know?

There are ~~3~~² main types of dialysis

Hemodialysis

This is the most common type of dialysis. This process uses an artificial kidney (hemodialyzer) to remove waste and extra fluid from the blood. The blood is removed from the body and filtered through the artificial kidney. The filtered blood is then returned to the body with the help of a dialysis machine.



Hemodialysis

Peritoneal dialysis

This involves surgery to implant a peritoneal dialysis catheter into your abdomen. The catheter helps filter your blood through the peritoneum. During treatment, a special fluid called dialysate flows into the peritoneum. The dialysate absorbs waste. Once the dialysate draws waste out of the abdomen, it's drained from the abdomen.

