Renal Failure & Dialysis Access

Dialysis is a treatment that artificially cleans the blood in patients with severe kidney (renal) disease. It removes waste products and impurities, regulates fluid levels and maintains electrolyte balance. There are two methods of dialysis: peritoneal dialysis and haemodialysis. Peritoneal dialysis uses the peritoneal membrane, which lines the abdomen. Haemodialysis uses a dialysis machine and requires direct access to large blood vessels to clean the blood.
Dialysis access may be temporary or permanent:
Temporary access: A tube (catheter) is inserted into a large vein in the upper chest to provide access for dialysis. Dialysis catheters are generally used in emergencies or for short-term access. Tunnelled catheters may be used for longer periods.

Permanent access: Permanent access is created surgically by connecting an artery and a vein to form an arteriovenous fistula (AVF) or by using a graft to form an arteriovenous graft (AVG).
Arteriovenous fistula (AVF): An AVF is created by connecting a large vein to a nearby artery, commonly at the wrist or near the elbow crease. The vein is divided and stitched to an opening in the side of the artery. Higher-pressure arterial blood flows into the vein, causing it to enlarge over time. This process, known as maturation, enables reliable access for dialysis.

Arteriovenous graft (AVG): An AVG connects an artery and a vein using a synthetic graft. Grafts are used when veins are unsuitable or blocked. One end of the graft is stitched to a vein and the other to an artery. The graft is placed beneath the skin of the lower arm, either in a straight configuration or, more commonly, as a loop. A synthetic AVG may also be constructed in a leg.

Assessment of the veins and arteries is an important step before creating dialysis access. Your vascular surgeon will commonly arrange an ultrasound assessment of the blood vessels in your arms and/or legs. This assessment helps confirm that the arterial blood supply to the proposed access site is normal and that the veins are suitable and of good quality. A diseased artery or a small or blocked vein can result in inadequate blood flow and access failure. Over time, an AV fistula enlarges and matures, making it easier for dialysis staff to access and allowing sufficient blood flow for effective dialysis. AVG generally become ready for use sooner than AVF, but they are more prone to infection. All types of fistulas will require life-long ultrasound monitoring.

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