NAVIGATING DIALYSIS

The AV Fistula Handbook

The Complete Guide To Understanding, Creating & Caring For Your AV Fistula

DR. NIKHIL PANSE

Navigating Dialysis: The AV Fistula Handbook

Your Complete Guide to Understanding, Creating, and Caring for Your AV Fistula

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"*Dedicated to the patients and caregivers of chronic kidney disease, whose grit, perseverance, and unwavering spirit inspire hope and strength every day.*"

Disclaimer

This book is intended solely for educational purposes and should not be considered a substitute for professional medical advice, diagnosis, or treatment. Every patient is unique, and medical decisions must be tailored to individual circumstances by a qualified healthcare professional.

Every effort has been made to provide accurate and up-to-date information, but medical science continually advances. While the author has aimed to reflect current practices, unintentional errors or omissions may occur. Readers are encouraged to consult a qualified medical professional before acting on any information presented in this book.

The repetition of certain questions or answers in some sections is intentional, designed to provide better context, reinforce critical concepts, and enhance clarity for readers.

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Preface

Chronic kidney disease (CKD) is a life-altering condition that brings with it a host of challenges for patients and their caregivers. As a plastic surgeon, I often encounter patients who require AV fistula surgery. It is a surgery that plays a pivotal role in enabling dialysis and significantly impacts their quality of life. However, I've noticed a recurring pattern: many patients and their families come to this critical juncture armed with misconceptions, unanswered questions, and a lack of clarity about what to expect before, during, and after the surgery.

This booklet is my humble initiative to address these gaps in knowledge. It aims to demystify the AV fistula surgery process, provide clear guidance on pre- and post-operative care, and help patients and caregivers better understand the steps they can take to prolong the life of their fistula. By equipping readers with this information, I hope to alleviate some of the anxiety and confusion that often surrounds this journey.

The content is structured into easily digestible sections, covering everything from understanding chronic kidney disease and dialysis to troubleshooting complications and addressing frequently asked questions. While the primary audience for this book is patients and their

caregivers, I believe it will also serve as a helpful resource for doctors and doctors managing CKD patients, enabling them to address common concerns effectively.

Presented in a conversational tone, this book is designed to feel like a supportive guide rather than a technical manual. The goal is simple: to help patients make informed decisions, embrace better care practices, and ultimately improve their quality of life.

I hope this booklet provides the clarity, confidence, and empowerment needed to navigate the journey of CKD with resilience and strength.

Warm regards and best wishes,

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Foreword

As a Plastic surgeon, over last 27 years I have had the privilege of being a part of the lifesaving journey of countless patients battling chronic kidney disease. The creation of an arteriovenous fistula is not merely a technical procedure; it represents a lifeline, a gateway to sustaining life through haemodialysis.

Despite the medical advances and alternative options for haemodialysis we've witnessed, the demand for well-functioning AV fistulas outpaces the number of patients who receive them. Barriers such as late referrals, limited access to healthcare facilities, lack of surveillance protocols post-surgery, misconceptions about the procedure and lack of awareness among patients compound these challenges.

Dr. Nikhil Panse's initiative to author a comprehensive handbook on AV fistulas bridges an essential gap in patient education and empowerment. This book, apart from describing the procedure, also emphasizes the queries and the hurdles patients face. It serves as both a technical resource and a beacon of hope for patients and caregivers alike.

By addressing the disease process, need for haemodialysis, how to prepare for and take care after fistula surgery this book will undoubtedly contribute to better awareness, timely interventions, and improved patient outcomes.

I congratulate Dr. Nikhil for this endeavour and believe it will serve as a handy book for patients on haemodialysis for years to come.

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Foreword

For a nephrologist, the journey of a patient with chronic kidney disease is one of partnership and constant care. The AV fistula plays a vital role in this journey. It is not just a tool for effective dialysis but also a symbol of hope, helping patients lead a life with dignity and better quality despite the challenges of their condition.

Dr. Nikhil Panse's book is a much-needed resource for patients, caregivers, and healthcare professionals. It explains everything about AV fistula care in a simple, clear, and easy-to-understand way. This book helps patients take an active role in their treatment, understand the importance of timely referrals, and see how AV fistulas support their care and outcomes.

As a nephrologist who also performs AV fistula surgeries, I truly value how this book simplifies the procedure and makes it accessible for patients. It bridges the gap between medical details and patient understanding, promoting better teamwork between patients and their healthcare providers.

Dr. Nikhil's work will surely connect with anyone affected by chronic kidney disease. It will create awareness and encourage timely care, making a real difference in the lives of many.

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Foreword

As a plastic surgeon who has personally walked the path of chronic kidney disease, AV fistula surgery, and a kidney transplant, I bring both professional and deeply personal insights to this foreword. Chronic kidney disease is not just a physical ailment; it challenges every aspect of one's existence—mental, emotional, professional and social. For me, the AV fistula was more than a surgical intervention; it was a symbol of resilience, a testament to the ingenuity of medical science that enables life to continue in the face of adversity.

Dr. Nikhil's book captures this spirit of resilience while offering an invaluable guide for patients and caregivers. By demystifying the AV fistula and addressing its challenges, it helps patients embrace their journey with a sense of empowerment rather than despair. The inclusion of numerous inspiring individuals towards the end of this book, who have lived meaningful and fulfilling lives despite the challenges of renal failure, and my own story as well serves as a testament to the resilience of the human spirit and the possibilities that lie beyond the disease.

I am honoured to contribute to this foreword and applaud Dr. Nikhil for creating a

resource which will undoubtedly guide countless individuals facing chronic kidney disease, reminding them that they are not alone and that a fulfilling life is within reach.

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Section 1: Understanding Chronic kidney disease

What is chronic kidney disease (CKD)?

Chronic kidney disease (CKD) is a gradual loss of kidney function over time. The kidney's ability to filter waste and excess fluids from the blood diminishes, leading to an accumulation of toxins in the body. When kidney function declines to below 15% of normal, it is considered end-stage renal disease (ESRD), necessitating dialysis or a kidney transplant to maintain life. It is here that the kidneys gradually stop working and can no longer clean the blood or remove waste effectively.

What are the main causes of CKD?

The primary causes of chronic kidney disease include:

- Diabetes Mellitus – Responsible for approximately 40% of all cases of CKD. High blood sugar can damage kidney blood vessels over time and harms the kidney's tiny blood filters.
- Hypertension (High Blood Pressure) – Accounts for nearly 25% of cases. Elevated

pressure damages blood vessels in the kidneys, impairing function.

- Glomerulonephritis – Inflammation of the kidney's filtering units, known as glomeruli, can lead to scarring and gradual decline.
- Polycystic Kidney Disease (PKD) – A genetic disorder where cysts form in the kidneys, impairing their function and ability to work properly.
- Chronic Obstruction – Conditions like kidney stones or an enlarged prostate can block urine flow and damage the kidneys.
- Repeated Kidney Infections – Chronic pyelonephritis can lead to scarring and gradual loss of kidney function over time.

How is CKD diagnosed?

CKD is diagnosed through a combination of laboratory tests, imaging studies, and clinical evaluations:

- Blood Tests – Measurement of serum creatinine and blood urea nitrogen (BUN) levels. Elevated creatinine indicates waste build up in the body and suggestive of decreased kidney function.
- Glomerular Filtration Rate (GFR) – A calculation based on serum creatinine, age, sex, and body size that estimates how well the kidneys are filtering. A GFR below 60

mL/min/1.73 m² for three months or more is indicative of CKD.

- Urinalysis – Identifies abnormalities such as proteinuria (excess protein in urine) or hematuria (blood in urine).
- Imaging Studies – Ultrasounds or CT scans may be used to visualize kidney structure and detect abnormalities.
- Kidney Biopsy – Sometimes performed to determine the underlying cause of renal disease. In a biopsy, a small sample of kidney tissue is examined.

What are the symptoms of chronic kidney disease?

CKD often progresses silently until advanced stages. Common symptoms include:

- Fatigue and Weakness – Due to reduced erythropoietin (hormone made by the kidneys that helps produce red blood cells) production, causing low red blood cell count (anemia).
- Swelling (Edema) – Fluid buildup in legs, feet, and face due to impaired kidney function.
- Decreased Urine Output – Although some may experience normal or increased urine output, the urine may lack waste products.

- Nausea and Vomiting – Accumulation of waste products in the blood can irritate the gastrointestinal tract.
- Itchy Skin (Pruritus) – Resulting from toxin buildup.
- Shortness of Breath – Caused by fluid in the lungs or anemia.

Confusion and Difficulty Concentrating – Due to toxin buildup affecting brain function.

What are the stages of chronic kidney disease (CKD)?

CKD is classified into five stages based on GFR:

- Stage 1 (GFR ≥90 mL/min/1.73 m^2) – Kidney damage with normal or high GFR. (Kidneys are still functioning well.)
- Stage 2 (GFR 60-89 mL/min/1.73 m^2) – Mild reduction in kidney function. (Slightly reduced kidney ability.)
- Stage 3 (GFR 30-59 mL/min/1.73 m^2) – Moderate reduction. Often when symptoms begin to appear. (Kidney function is moderately low.)
- Stage 4 (GFR 15-29 mL/min/1.73 m^2) – Severe reduction. Preparation for dialysis or transplant starts. (Kidneys are close to failing.)

- Stage 5 (GFR <15 mL/min/1.73 m²) – End-stage renal disease. Dialysis or transplant needed. (Kidneys no longer work properly.)

What is the disease burden of CKD?

CKD is a major global health concern, affecting approximately 10% of the population worldwide, which equates to around 850 million individuals, as highlighted by the International Society of Nephrology. This disease significantly diminishes quality of life, with studies from AstraZeneca indicating a 24% reduction compared to the general population, impacting mobility, mental health, and daily activities.

CKD also imposes a considerable economic and productivity burden; the Health Economics Review notes that End-Stage Kidney Disease (ESKD) patients experience a 25–56% reduction in lifetime employment duration and a 32–66% decrease in productivity. Furthermore, findings from the International Society for Pharmacoeconomics and Outcomes Research **(**ISPOR) reveal that individuals with CKD report up to a 31% decline in work productivity, with many being unable to work due to medical reasons.

In the United States alone, the CDC estimates that 14% of adults—about 35.5 million people—are

living with CKD. The financial strain on healthcare systems is substantial, as per the National Library of Medicine, with costs escalating as CKD progresses. These statistics underscore the critical need for early detection and effective management to improve quality of life, reduce financial losses, and alleviate the global burden of CKD.

How does CKD affect daily life?

CKD significantly impacts on a person's quality of life. It can lead to chronic fatigue, making daily tasks difficult. Patients often experience dietary restrictions, needing to limit sodium, potassium, and phosphorus intake. Frequent medical appointments and treatment sessions (e.g., dialysis) can disrupt work and social activities. Emotional stress and anxiety are common, as patients cope with changes in lifestyle and long-term health outlooks.

What are the treatment options for CKD?

Treatment aims to slow the progression and manage symptoms:

- Lifestyle Modifications – Dietary changes include low-sodium, low-potassium diets. Regular exercise helps maintain overall health.
- Medications – Includes antihypertensives to control blood pressure, erythropoiesis-stimulating agents (ESAs) for anemia,

phosphate binders, and diuretics. These are mainly the drugs to manage blood pressure and anemia.

- Treating Underlying Conditions – Managing diabetes or high blood pressure effectively.
- Dialysis – Either hemodialysis or peritoneal dialysis is used when kidney function drops below 10-15%.
- Kidney Transplant – The most definitive treatment; involves replacing a failed kidney with a healthy donor kidney.

What is dialysis? Why is dialysis needed in CKD patients?

Dialysis is a process that cleans the blood when kidneys can't.

Dialysis is necessary when kidneys can no longer remove enough waste and excess fluid from the blood. It helps maintain electrolyte balance and prevent the buildup of toxins that can lead to severe complications, such as uremia. There are two main types:

Hemodialysis – Blood is filtered through a machine and returned to the body. (The machine cleans the blood.)

Peritoneal Dialysis – A solution is introduced into the abdominal cavity to absorb waste and then drained. (The body's lining acts as a filter.)

Dialysis can extend life and improve quality of life and can have its own side effects like fatigue and infections.

Which dialysis is better, hemodialysis or peritoneal dialysis?

The choice between haemodialysis and peritoneal dialysis is a deeply personal and medical decision, tailored to the patient's specific health condition, lifestyle, and preferences. Neither method is universally superior, as both have unique advantages and challenges that make them suitable for different individuals.

Haemodialysis is often the preferred option for patients who require efficient removal of waste and excess fluid in shorter treatment sessions. Typically performed three times a week for about four hours per session, it is carried out in a dialysis centre under professional supervision, ensuring close monitoring for any complications. This makes it an excellent choice for patients who are unable to manage their care independently.

However, it requires a vascular access, such as an AV fistula, which takes time to mature before it can be used. Some patients may find haemodialysis physically demanding, as it can lead to side effects such as fatigue or low blood pressure. Additionally, the need for scheduled

visits to the dialysis centre can limit flexibility for those with demanding lifestyles.

On the other hand, peritoneal dialysis offers greater flexibility and independence, as it can be performed at home or even while traveling. This method involves continuous filtration that more closely mimics the natural function of the kidneys, potentially resulting in fewer dietary restrictions for some patients. Unlike haemodialysis, it does not require vascular access, which lowers the risk of bloodstream infections.

However, peritoneal dialysis does carry its own risks, such as a higher chance of peritonitis, an infection of the abdominal lining. It also demands strict adherence to aseptic techniques and a level of manual dexterity that not all patients may possess. Additionally, it may not be as effective for individuals with severe toxin buildup or those who have significant abdominal scarring.

Globally, haemodialysis is more commonly used, particularly for patients with advanced disease or multiple health conditions, due to its efficiency and the close monitoring provided in a clinical setting. However, peritoneal dialysis remains an excellent option for patients who value independence, have stable health, and prefer a home-based treatment approach.

Ultimately, the decision between these two modalities is individualized, based on the patient's medical needs, anatomy, and personal preferences. A healthcare team carefully evaluates these factors to recommend the most suitable option. In this book, the primary focus is on haemodialysis, as it discusses AV fistulas, a key component in the haemodialysis process.

Section 2: Dialysis process and care

Is dialysis painful?

Dialysis itself is generally not painful. However, some patients might feel discomfort during needle insertion if they have a fistula or graft. Over time, most people get accustomed to this.

How long does a dialysis session take?

A typical hemodialysis session can last about 4 hours and is typically done two-three times a week. However, the exact time can vary based on factors like body size, blood flow rate, and toxin levels in the blood.

What should I consider when choosing a dialysis center?

When selecting a dialysis center, consider its proximity to your home, staff experience, and infection control measures. Look for centers accredited by reputable organizations like Medicare in the U.S. or NABH in India. Direct references from other patients can be a valuable tool to choose a dialysis center. You might also want to check patient reviews and visit the center to ensure a clean, welcoming environment.

Centers offering flexible schedules and advanced technology can improve your overall experience.

Does the technique used during dialysis affect the longevity of my AV fistula?

Yes, proper technique during dialysis is critical for maintaining the health of your AV fistula. Skilled staff will ensure gentle handling, correct needle placement, and avoidance of repeated use of the same puncture sites (called the “buttonhole technique”). Poor practices can lead to complications like thrombosis (clotting) or stenosis (narrowing), which might shorten the fistula’s lifespan. Although there are various factors involved, with proper care, a well-cared-for fistula might easily last 3–7 years or longer.

What should I do to prepare for a dialysis session?

Preparation includes:

Dietary adjustments: Avoid heavy meals or foods high in potassium or phosphorus before dialysis.

Fluid balance: Stick to your prescribed fluid restrictions to prevent complications.

Clothing: Wear comfortable, loose-fitting clothes to make access to your fistula or catheter easier.

Medications: Follow your doctor’s advice on which medicines to take or skip before the session. For

example, in some patients, blood pressure medications are often avoided right before dialysis.
Arrive early to relax and allow staff to check your vital signs before starting.

What care should I take immediately after a dialysis session?

After dialysis, rest for a few minutes before standing up, as blood pressure might be low. Keep gentle sustained pressure over the puncture site to prevent post dialysis oozing. Keep the needle insertion site clean and avoid heavy lifting with the arm used for the fistula. Monitor for symptoms like dizziness, nausea, or cramping, which are common side effects. Ensure you stay hydrated within prescribed limits and eat a light, nutritious meal to replenish energy.

What dietary restrictions should I follow while on dialysis?

A dialysis diet usually limits sodium, potassium, phosphorus, and fluid intake to prevent complications like high blood pressure, swelling, and bone disease. Protein needs increase, as dialysis removes protein waste. Common recommendations include lean meats, eggs, white bread, rice, and specific fruits like apples and berries. Always work with a dietitian to customize your plan.

Can I do dialysis at home, and how does it differ from in-center dialysis?

Home dialysis is an option for both hemodialysis and peritoneal dialysis. Home hemodialysis requires a trained partner and offers more flexibility in scheduling. Peritoneal dialysis is entirely self-managed, making it a convenient option. Home dialysis often allows patients to perform longer or more frequent sessions, which can lead to better health outcomes. However, it requires significant commitment and space for equipment and supplies.

Will I feel tired or weak after dialysis, and how can I manage these side effects?

Fatigue is common after dialysis due to the removal of fluid and toxins, but it should improve as your body adjusts to treatment. To manage this, ensure adequate sleep, follow a nutritious diet, and stay active within your energy limits. If fatigue persists, consult your doctor to check for anemia or other underlying causes.

Are there risks or complications associated with dialysis?

Yes, complications can occur, including infections at the access site, low blood pressure during treatment, or imbalances in electrolytes. Long-term hemodialysis might lead to amyloidosis (protein buildup in joints) or cardiovascular strain.

How often will I need dialysis, and does the frequency depend on my condition?

Frequency depends on factors like kidney function, body size, and toxin levels. Frequency can vary from once a week to even thrice a week or more. Some patients benefit from more frequent or longer sessions, which can improve well-being and reduce complications.

What should I do if I miss a dialysis session?

Missing a session can lead to dangerous fluid and toxin buildup. If you miss one, reach out to your dialysis center immediately to reschedule. Avoid compensation by increasing your next session's duration without medical guidance, as this might strain your heart or blood vessels.

How do I care for the access site to avoid infections?

Always keep the area clean and dry. Avoid scratching or applying lotions. For fistulas and grafts, rotate needle insertion sites to prevent wear and tear. For catheters, use sterile dressings and follow your surgeon’s cleaning instructions. Report redness, swelling, or fever to your surgeon immediately.

Section 3: AV Fistula: Preparation, Care & Maintenance

What is an AV fistula?

An arteriovenous (AV) fistula is a surgical connection made between an artery and a vein, usually in the forearm. This connection allows blood to flow directly from the artery into the vein, creating a high-flow vessel that can be used for hemodialysis. In simpler terms, it is a surgical link between two blood vessels that makes blood flow faster and easier for dialysis treatment. AV fistulas are essential for patients with chronic kidney disease (CKD) who need long-term dialysis.

How is an AV fistula created?

Creating an AV fistula involves a surgical procedure performed by a trained surgeon. The surgeon makes an incision in the arm and connects a nearby artery to a vein, often in the wrist or arm. This process redirects blood flow to increase the size and strength of the vein over time, making it suitable for repeated needle insertions during dialysis.

Will the AV fistula cure my CKD?

No. AV fistula is only performed to facilitate easy dialysis. It is not a cure for CKD.

Why is an AV fistula the preferred option for dialysis?

An AV fistula is preferred because it provides reliable, long-term vascular access with fewer complications compared to other access types. It has a lower risk of infection, clot formation (thrombosis), and other complications. Additionally, AV fistulas have a longer lifespan than synthetic grafts or central venous catheters. AV fistulas can last many years, providing effective and efficient dialysis access.

What are the different types of vascular access for dialysis?

There are three main types of vascular access for dialysis:

Arteriovenous (AV) Fistula: As described, it is the gold standard due to its durability and low complication rates.

Arteriovenous (AV) Graft: A synthetic tube used to connect an artery and vein when a patient's own veins are not suitable for a fistula.

Central Venous Catheter: A temporary tube placed into a large vein, typically in the neck or chest,

used when immediate access is needed or when other options are not feasible. These are different methods of getting blood flow for dialysis.

When can I do dialysis through the AV fistula after surgery?

An AV fistula can take from 6 to 12 weeks to mature fully. This maturation period allows the vein to become strong enough for regular needle insertions without collapsing. It usually takes about 2-3 months for the fistula to be usable for dialysis, but it can be longer. After clinical evaluation, and possibly a doppler study, your Nephrologist will advise regarding use of fistula for dialysis.

Can all patients with CKD get an AV fistula?

Not all patients with chronic kidney disease are suitable candidates for an AV fistula. Factors such as poor vascular health, small or weak veins, thrombosis of venous system, advanced age, or underlying cardiac and medical conditions may prevent the successful creation of a fistula, or fistula creation might not be advisable at all. Patients with small or weak veins may require an AV graft or central venous catheter instead.

What does the procedure for creating an AV fistula involve?

The procedure involves making an incision and carefully connecting an artery to a vein. This surgery is done under magnification using fine suture materials, as the surgery involves connecting very small blood vessels to each other. After the procedure, the patient is monitored for signs of proper blood flow and any immediate complications. Recovery involves allowing the fistula to develop and strengthen over time, with regular checks to confirm maturation.

Why is an AV fistula important for dialysis?

An arteriovenous (AV) fistula is crucial for dialysis because it provides a reliable, long-term access point that ensures efficient blood flow. This type of access connects an artery to a vein, creating a high-flow vessel suitable for repeated needle insertions required for hemodialysis. The high-pressure blood flow from the artery helps the vein enlarge and thicken over time, making it easier to puncture and reducing the risk of clotting. (In simpler terms, it's an access point created to help dialysis run smoothly over a long period.) According to data from various renal health studies, AV fistulas have lower rates of infection and thrombosis compared to other forms of vascular access.

How does an AV fistula help improve dialysis efficiency?

An AV fistula enhances dialysis efficiency by providing a higher blood flow rate than other types of access, such as central venous catheters. This increased flow allows for more blood to be cleaned during each session, leading to more effective toxin removal. A well-functioning AV fistula can facilitate blood flow rates between 350-500 mL/min, which significantly improves the clearance of waste products. The strong blood flow through an AV fistula helps clean your blood better and more quickly. Studies have shown that patients with AV fistulas have better dialysis adequacy and fewer complications compared to those using other methods.

What are the advantages of an AV fistula compared to other access types?

The advantages of an AV fistula over other types of vascular access include:

Lower infection rates: Since it is created using the patient's own tissue, there is less risk of infection compared to synthetic grafts or catheters.

Longer lifespan: AV fistulas can last for years, with some functioning for more than a decade with proper care. (This means they can be used for many years without needing replacement.)

Lower risk of thrombosis (blood clots): AV fistulas are less prone to clotting compared to synthetic grafts and central lines.

Improved dialysis adequacy: The high flow of blood allows for more efficient dialysis sessions. In simple terms, an AV fistula is safer, lasts longer, and performs better compared to other access points like catheters or grafts.

Why should I avoid doing long term dialysis through a neckline or a femoral catheter?

Dialysis through a central venous catheter (such as a neckline or femoral catheter) is associated with several risks and should only be used as a temporary solution. The primary concerns include:

Higher infection risk: Catheters sit directly in a central vein and are prone to infections, which can lead to severe complications like sepsis.

Increased clotting: Catheters are more likely to clot, leading to interruptions in dialysis treatment.

Lower blood flow rates: Central catheters typically provide a lower blood flow rate, reducing the effectiveness of dialysis. Statistics indicate that catheter use is associated with a 2-3 times higher risk of bloodstream infections compared to AV fistulas.

How long can an AV fistula last?

With proper care and monitoring, an AV fistula can last many years. It is difficult to comment on the exact life span of an AV fistula as it varies from patient to patient and depends on many factors such as the patient's overall health, vascular condition, and adherence to post-procedure care.

What are the potential complications of not using an AV fistula for dialysis?

Apart from the things discussed previously, it can lead to increased hospitalization. The complications associated with catheter use often lead to more frequent hospital visits and extended stays. Studies have shown that patients using catheters are at a higher risk for mortality compared to those with AV fistulas due to the increased complications and lower dialysis adequacy. Simply put, not using an AV fistula means more health issues and less effective dialysis.

What should I do after I have been advised to have AV fistula surgery?

When you have been advised to have AV fistula surgery anticipating the need for future dialysis, there are a couple of things you should be aware of. The hand where the AV fistula surgery is being planned should not be pricked for giving IV fluids or injections. Also, blood samples should not be

drawn from that extremity. Recent punctures are not good for AV fistula creation and increase the chances of failure of AV fistula surgery. As a rule, anything which is likely to traumatize the veins of that particular extremity should be avoided. Similarly, you should also be aware that regular grip strengthening exercises pump more blood into the veins and dilate them. This helps in the process of AV fistula creation. Regular grip strengthening exercises should therefore be initiated anticipating the need for future AV fistula surgery. Consult your operating surgeon for detailed evaluation and advice on preoperative care and precautions.

What should I do before my AV fistula surgery?

Before AV fistula surgery, it is important to follow your surgeon's instructions, which may include fasting for a specific period, taking your dose of medications for hypertension and diabetes as per schedule, and arranging for post-surgical transportation. Stay hydrated as per your recommended fluid intake, and adjust your medications as instructed. Studies show that preoperative optimization can reduce complication rates by up to 15%.

How do I choose the right surgeon for the procedure?

Choose a surgeon who has experience in AV fistula creation. Although AV fistula surgery is performed by surgeons of various specialties, it is more commonly performed by plastic surgeons or vascular surgeons. Review the surgeon's qualifications and patient outcomes. Research indicates that centers with higher surgical volumes and experienced surgeons have higher success rates of AV fistula creation.

What tests are done before AV fistula surgery?

Preoperative evaluation includes blood work to check hemoglobin levels and coagulation profile, kidney function tests, and some other test depending on patient condition. Imaging studies like Doppler ultrasound is performed to assess the quality of artery and vein, especially in those patients where clinical assessment appears questionable. It can also be used to assess the venous system in the proximal arm and neck in patients where thrombosis/clotting is suspected.

Is Doppler of my upper limb necessary before doing an AV fistula?

Yes, a Doppler ultrasound is often essential for evaluating the size, flow, and condition of the veins and arteries in the upper limb. It helps check

blood vessels to ensure they are of adequate caliber and suitable for surgery. Ensuring that blood vessels are suitable for surgery can improve the outcomes of AV fistula surgery.

What will my surgeon evaluate preoperatively before performing AV fistula surgery?

The surgeon will evaluate the anatomy of veins and arteries, overall health status, medical history, and any history of prior surgeries or IV access. Factors like vein patency, vein compressibility, straight segment of vein, arterial flow, and any signs of edema (swelling) or vein thrombosis will be assessed. Good quality veins on preoperative vein assessment have been shown to improve outcomes of AV fistula surgery.

Can I do dialysis immediately before or immediately after my AV fistula surgery?

Dialysis immediately before or after AV fistula surgery can pose challenges, as it can lower blood pressure and lead to vein collapse, thereby increasing the risk of failure. However, the decision to proceed with dialysis depends on the individual patient's medical condition and blood parameters, such as potassium levels, fluid overload, or other critical factors. It is important to note that this decision is highly individualized, and your surgeon and nephrology team are the best

guides to assess your condition and determine the most appropriate course of action. Always discuss your concerns and follow their recommendations to ensure the best possible outcome.

Should I stop taking any medications before surgery?

When performing the surgery under local anesthesia, most surgeons won't stop your blood thinner medications like aspirin. AV fistula surgery is vascular surgery, and blood thinner prevents clot formation in the post operative period. If the surgery is being performed under regional anesthesia like brachial block, or general anesthesia, your surgeon might want to stop your blood thinner medications. This decision is highly individualized and depends on the coagulation profile of patients among other factors. Your surgeon will guide you on which medication to stop. Essential medications for chronic conditions, such as antihypertensives, are generally continued as per their schedule. Follow your surgeon's advice closely to minimize any risks.

How long does the surgery take?

AV fistula surgery generally takes between 1 to 2 hours, depending on the complexity of the procedure and patient anatomy. The surgery is performed in a lying down position with outstretched hand. Most patients can expect to

return home the same day, as hospital stays for this type of surgery are uncommon, with outpatient procedures accounting for more than 90% of cases.

When should I not undergo AV fistula surgery?

AV fistula surgery may not be recommended if there is severe peripheral vascular disease, infection at the planned site, or insufficient vein or artery quality. Patients with advanced heart failure or significant comorbidities may also be at risk. Studies show that patients with these contraindications have significantly higher complication rates.

What alternatives do I have if I am not a candidate for AV fistula surgery?

If an AV fistula is not feasible, alternative options include arteriovenous grafts or central venous catheters like tunneled central venous catheter. Grafts, made from synthetic materials, are used when the quality and/or caliber of the veins is not appropriate for AV fistula surgery creation.

A tunnelled central venous catheter is a tunnelled central venous catheter specifically designed for long-term use in haemodialysis. It serves as a temporary vascular access for patients who cannot undergo surgery for an arteriovenous (AV) fistula or graft, or while waiting for these permanent

access sites to mature, which can take weeks to months. Made of flexible, biocompatible material, the tunnelled central venous catheter features two lumens: one to draw blood from the body to the dialysis machine and another to return the filtered blood. It is typically inserted into large central veins, such as the internal jugular or subclavian veins, under local anaesthesia. Part of the catheter is tunnelled under the skin, creating a barrier against infections and anchoring it securely, while the externalized portion connects to the dialysis machine.

Tunnelled central venous catheter provides immediate access for urgent dialysis, making it a critical tool for patients requiring haemodialysis when permanent access like AV fistula is unavailable or delayed. Its design reduces infection risks compared to non-tunnelled catheters, but it still carries higher infection rates than AV fistulas or grafts. Prolonged use of tunnelled central venous catheters can also lead to complications such as blood clots, vein damage, or scarring, which may compromise future vascular access.

Patients must maintain the external portion of the catheter with meticulous care, including sterile dressing changes and regular flushing with anticoagulant solutions to prevent clot formation. Although a tunnelled central venous catheter is a

minimally invasive and effective solution for medium-term haemodialysis, it is considered a temporary option while preparing more durable access.

Will I need to fast before the surgery?

Most of the AV fistula surgeries are performed under local anesthesia. In such cases preoperative fasting is not required. However, in children or uncooperative or anxious patients, general anesthesia will be required. In such cases, fasting of 6-8 hrs. before surgery is typically required to reduce the risk of complications related to anesthesia.

What type of anesthesia is used during AV fistula surgery?

Local anesthesia with/without sedation is commonly used for AV fistula surgery, allowing patients to remain comfortable and relaxed. In some cases, regional (anesthetizing the entire upper limb) or general anesthesia may be chosen based on patient factors. Local anesthesia has been shown to reduce recovery time and is associated with fewer anesthesia-related complications.

On which hand is AV fistula surgery done?

AV fistula surgery is generally performed on the non-dominant hand. For example, right-handed individuals usually have surgery on their left arm.

Although the non-dominant extremity is preferred, the choice predominantly depends on the quality of veins. It is preferable to perform AV fistula surgery on extremity with larger caliber, and good quality veins as assessed by clinical and/or imaging modalities.

Where is the site of AV fistula surgery?

The preferred site is usually the forearm, near the wrist (radio cephalic fistula) or the upper arm, near the elbow (brachiocephalic fistula), depending on the quality and size of the blood vessels.

How is the site of AV fistula surgery decided?

Generally, AV fistula near the elbow has higher blood flowing through it. Therefore, the chances of post operative problems like steal, venous hypertension are more. Similarly, AV fistula near the wrist has higher chances of post operative problems like stenosis and blockage as compared to AV fistula near the elbow. This decision regarding the site of the fistula is based on a lot of patient factors. Generally, if veins are of good quality and have adequate caliber near the wrist, that site is preferred. If not, the site near the elbow is preferred.

My hemoglobin is less. Should I go ahead with AV fistula surgery?

Most patients with CKD will have low hemoglobin(anemia). It would be ideal to have optimal hemoglobin levels before surgery. However, it is generally a slow process and takes time, unless blood transfusion is considered. This decision to operate or not with lower hemoglobin levels than normal is taken by the operating surgeon depending on the clinical evaluation of the patient, and urgency of the procedure required.

I had recent pricks on my hand/forearm. My doctor is refusing surgery. What should I do?

Repeated needle pricks can compromise the quality of the veins needed for AV fistula creation. If your doctor advises against surgery, discuss alternative vein options or consider waiting until the veins recover. During this waiting period, your surgeon might advise ointment for local applications which will help to dissolve small clots and alleviate bruising. This can help in maintaining vein integrity and improve fistula success rates.

I am a cardiac patient. Will AV fistula surgery be risky for me?

Cardiac conditions can increase the risk associated with AV fistula surgery. A comprehensive evaluation, including an assessment by a cardiologist, may be needed to determine if the benefits outweigh the risks. The risk assessment process is crucial, as data show that patients with significant cardiac conditions may have significantly higher complication rates.

What happens during the AV fistula surgery?

During AV fistula surgery, the surgeon creates a direct connection between an artery and a vein, usually near the wrist or near the elbow. The surgeon makes a small incision to access the selected blood vessels. An opening is then made in the artery and the vein, and they are connected using fine stitches.

Will I feel pain during or after the surgery?

During the surgery, you will not feel pain because a local/regional/general anesthetic is used to numb the area. This ensures you remain comfortable throughout the procedure. Post-surgery, mild discomfort or pain is common as the anesthesia wears off. Your doctor may prescribe over-the-counter pain medication or mild analgesics to help manage any discomfort. Pain

levels vary but are generally manageable and subside within a few days. Report any severe or prolonged pain to your doctor, as it could indicate complications.

How soon after surgery can I use my AV fistula for dialysis?

The AV fistula needs time to mature before it can be used for dialysis. Typically, this takes between 6-12 weeks. During this period, the vein becomes larger and stronger due to increased blood flow. In some cases, the fistula may take up to 4-6 months to fully mature. Using the fistula too soon can damage it, so your healthcare team will assess it before first use. During this waiting period, an alternative dialysis access method, such as a central venous catheter, may be used.

What should I expect in terms of hospital stay and recovery?

AV fistula surgery is often performed as an outpatient procedure, meaning you can go home the same day. However, you may need to stay in the hospital for a short time if additional monitoring is required due to health conditions. Recovery typically involves resting the arm and avoiding heavy lifting for about 2-3 weeks. Swelling and bruising around the incision site are common and should subside within a few days.

Follow-up with your surgeon will ensure the fistula is healing properly.

Are there any risks associated with the surgery?

As with any surgery, AV fistula creation comes with potential risks. These include infection, bleeding, blood clots, and problems with fistula maturation (e.g., the vein not enlarging enough). Stenosis (narrowing of the vein) or aneurysm formation (a bulge in the vein) can also occur. Primary failure of an AV fistula is also a possibility. It refers to the inability of the fistula to mature adequately for effective use in hemodialysis. This means that the fistula does not develop the size, strength, or blood flow required to withstand repeated needle punctures and deliver sufficient blood for dialysis treatment. Nerve damage is rare but possible.

What are the signs of successful surgery?

Signs of a successful AV fistula surgery include noticeable swelling of the vein and a “thrill”—a vibration felt when touching the site. This indicates proper blood flow through the fistula. Over the next few weeks, the vein should become more prominent and feel firmer. It’s important to monitor the fistula regularly and notify your surgeon if there are any changes, such as redness, warmth, or reduced flow.

Can AV fistula surgery be performed on my leg?

Yes. Although AV fistula surgery can be performed on the leg, it is not preferred. Fistulas on the leg have less success rates, and higher complication rates as compared to upper limb AV fistulas and are therefore avoided.

I have paralysis on one side. Can I get my AV fistula done on that side?

Yes, AV fistula surgery can be performed on the side with paralysis, if the blood vessels in that arm are healthy and suitable for surgery. It is important to evaluate the circulation and potential for fistula maturation carefully. The decision will depend on thorough assessments by your surgeon. Sometimes, the non-paralyzed side is preferred due to ease of access and use.

How do I take care of my AV fistula after surgery?

After AV fistula surgery, care is essential to ensure it heals well and functions properly. Avoid tight circumferential dressing which can compromise the blood flow to the AV fistula. The surgical area should be kept clean and dry, and unnecessary touching should be avoided. Protect the fistula arm by not wearing tight clothing or jewelry over it and avoid carrying heavy weights or sleeping on that side. Monitoring the fistula daily is vital. You

should feel a vibration, known as a “thrill,” at the site, which indicates good blood flow. To prevent infections, always wash your hands thoroughly before and after handling the area.

I have been advised to exercise. How early should I start exercises? What type of exercises should I do?

The exercise timeline may vary depending on the patient’s condition, the surgeon’s recommendations, and the type of fistula created. We typically advise soft ball compression exercises 6-8 hours after the surgery. In addition, grip strengthening exercises using a gripper are advised in due course of time to promote maturation of fistula. The operated limb should be kept elevated, and not dependent during the exercises to keep the swelling minimal

Why are exercises important after AV fistula surgery?

Exercises, especially those involving the fistula arm, help promote fistula maturation, which is the process of enlarging and strengthening the vein to handle the high blood flow required for hemodialysis. Increased blood flow improves vein dilation, vein wall thickening, and overall durability of the fistula.

How frequently should I do the exercises?

The recommendations may vary based on every surgeon's individual experience. A common suggestion is to perform exercises for 10-15 minutes per session 4-5 times a day. Some surgeons advise exercise of 5 minutes every awake hour of the day. This should be continued till the fistula has matured adequately for dialysis to be performed.

What type of exercise should I avoid in the early stages after AV fistula surgery?

After AV fistula surgery, certain types of exercises and activities should be avoided to protect the fistula and ensure proper healing and maturation. Heavy lifting or weight-bearing activities, such as carrying groceries, weights, or heavy bags with the fistula arm, should be avoided as they can increase pressure inside the vein, leading to complications like hematoma or thrombosis.

High-impact exercises, such as tennis, which involve jerking motions or repetitive impact, should also be avoided, as they can strain the delicate vessels at the fistula site. Activities that compress the arm, such as carrying heavy backpacks or performing certain yoga poses, may restrict blood flow to the fistula and hinder its development.

Similarly, repetitive stress movements, such as intensive wrist or gripping motions, should be minimized in the early healing phase. Instead, as discussed above, patients are encouraged to engage in gentle hand grip exercises using a soft ball or sponge to enhance blood flow and promote maturation. Following your surgeon's guidance and gradually resuming normal activities is crucial to protecting the fistula and ensuring its successful maturation.

Are there any specific things I should avoid during recovery?

Activities that put prolonged pressure on the arm, such as wearing tight sleeves, watches, or bracelets, should be avoided. Blood pressure measurements and blood draws on the fistula arm should not be performed.

Can I have a bath over the operated site?

Whether you can have a bath over the wound depends on multiple factors; more importantly the status of the suture line. This decision is best taken in consultation with the operating surgeon. If the suture line is dry, after 7 to 10 days, we typically advise gentle washing with soap and water. Always ensure the area is patted dry with a clean towel after washing.

When can I resume normal activities after surgery?

Most people can resume light activities, such as writing or eating or driving within a week after surgery. As discussed above, heavier activities or those involving the fistula arm, such as lifting or heavy exercise, should be delayed sufficiently for fistula maturation.

There is constant discharge from my surgical incision after surgery. What should I do?

Constant discharge from the incision could indicate an infection or delayed healing. You should do regular dressings and contact your surgeon. Avoid using non-breathable materials over the site to prevent further complications.

After surgery, after going home my dressing is soaked in blood. What should I do?

Minimal soakage with a slight tinge is common after AV fistula surgery. If your dressing becomes soaked in blood, apply firm but gentle pressure to the site with a clean cloth or gauze. Elevate your arm. Maintaining gently but firm pressure and limb elevation, you should contact your surgeon or doctor.

What are the signs of an infection or complication?

Signs of infection include redness, swelling, warmth, persistent pain, fever, or chills. Complications may present as excessive swelling in the arm or hand, constant oozing from the fistula site, or the absence of a vibration (thrill) at the site. If any of these signs occur, contact your surgeon/doctor promptly.

How do I know if my AV fistula is functioning well?

The most reliable way to check if your AV fistula is functioning well is to feel for the vibration or “thrill” at the fistula site daily. This vibration should be constant and strong. If you have access to a stethoscope, you can also listen for a "whooshing" sound, called a bruit. Any changes in the thrill or bruit should be reported to your doctor.

Should I monitor my fistula daily?

Yes, daily monitoring is essential to detect any early signs of infection or complications. Check for the presence of a thrill or bruit, look for signs of infection such as redness or swelling, and note any changes in the size of the fistula. Daily monitoring helps ensure early intervention if any issues arise.

What precautions should I take to protect my AV fistula?

Protecting your AV fistula is critical for its longevity. As discussed above, avoid blood pressure measurements, blood draws, or wearing tight clothing on the fistula arm. Protect the arm from cuts, scratches, or injuries, and avoid sleeping on it to prevent compression. Staying hydrated as per your daily recommendation and following up regularly with your doctor also helps maintain fistula health.

How can I keep my AV fistula healthy over the long term?

Maintaining a healthy AV fistula requires consistent care. Start by protecting your fistula arm: avoid wearing tight clothing or jewelry, and don’t carry heavy bags or rest weight on the arm. Regularly check for a "thrill" (a buzzing sensation at the fistula site) using your fingers, as it indicates proper blood flow. Maintain good hygiene to prevent infections by cleaning the area with soap and water daily. Report any signs of redness, swelling, pain, or reduced blood flow to your doctor immediately.

What lifestyle changes should I adopt to support my fistula and overall health?

A healthy lifestyle significantly impacts the longevity of your fistula and overall well-being. Stick to a balanced diet low in sodium, potassium,

and phosphorus as advised by your dietitian. Stay active, with gentle exercises like walking, which improve circulation. Avoid smoking and alcohol, as they harm blood vessels. Manage conditions like diabetes and high blood pressure with medications and regular monitoring, as they can affect your fistula's performance and your kidney health.

What precautions should I take before and after dialysis sessions?

Before dialysis, make sure you stay hydrated (as recommended by your doctor) and avoid using your fistula arm for blood pressure measurements or blood draws. After dialysis, avoid scratching or rubbing the needle site, and apply gentle pressure to stop bleeding. Monitor the site for signs of infection or clotting.

How often should I visit my doctor to monitor my fistula?

Regular check-ups are crucial. Your doctor or dialysis technician will inspect your fistula during each dialysis session for signs of complications. Additionally, schedule a comprehensive vascular access review every three to six months or as recommended by your doctor to ensure your fistula remains functional.

How can I reduce the risk of clotting in my AV fistula?

To reduce clotting risk, avoid prolonged

immobility and repetitive pressure on your fistula arm. Stick to your prescribed medications, particularly blood thinners if recommended. Stay hydrated within your fluid allowance to maintain good blood flow, and avoid excessive weight gain, which can strain your veins.

Can stress or mental health affect my fistula's health?

Yes, chronic stress can raise blood pressure and negatively impact your overall health, including your fistula. Managing stress through relaxation techniques like meditation, breathing exercises, or hobbies can help. If you feel overwhelmed, consider joining a support group for kidney patients to share experiences and coping strategies.

Are there specific dietary considerations to protect my fistula and kidney health in the long run?

Yes, a renal-friendly diet is key. Focus on high-quality proteins, fresh fruits (low-potassium varieties like apples or berries), and vegetables (such as cauliflower or lettuce). Limit processed foods, which are often high in sodium and phosphorus. Work closely with your dietitian to tailor your diet to your dialysis and health needs.

How long can an AV fistula last if properly cared for?

With proper care, an AV fistula can last for many years, sometimes even decades. Studies show that fistulas are the most durable dialysis access, with fewer complications compared to grafts or catheters. Consistent care, monitoring, and adherence to medical advice are crucial to maximizing its lifespan.

Can I travel with an AV fistula, and what precautions should I take?

Yes, traveling is possible with an AV fistula. Plan ahead to locate dialysis centers at your destination and ensure continuity of care. Pack all necessary medications, a dialysis schedule, and your doctor's contact information. Avoid using your fistula arm for lifting heavy luggage and carry hand sanitizers to maintain hygiene during travel. Many countries including India have an extensive network of dialysis centers. Proper planning in consultation with your doctor will ensure smooth travel.

Will the AV fistula affect my arm’s strength or movement?

An AV fistula generally does not cause significant weakness or limit movement in your arm once it heals. Initially, you may experience mild discomfort or stiffness, but with proper exercises and care, this should resolve. Over time, as the fistula matures, the veins in the arm may enlarge,

but this does not typically interfere with the arm's function. Studies have shown that patients with AV fistulas can maintain normal strength and range of motion in the affected arm.

What if my AV fistula does not mature properly?

Sometimes, an AV fistula may not develop as expected, a condition called non-maturation, which can occur in up to 40 percent of cases. This can happen due to small or weak blood vessels, poor blood flow, or other medical conditions. If your fistula does not mature properly, your doctor may recommend additional procedures to improve blood flow or create a new fistula in another location. Early monitoring and regular follow-ups can help address any issues quickly.

Can an AV fistula fail, and what happens if it does?

Yes, an AV fistula can fail due to complications like clotting, narrowing of the blood vessels, or infection. Fistula failure can interrupt dialysis, so it is essential to monitor its function daily by checking for a vibration (thrill) or a “whooshing” sound (bruit). If a fistula fails, it may require surgical intervention to restore its function or the creation of a new fistula. Advanced techniques, such as stenting or catheter-based interventions, are also available for restoring a failing fistula.

How do I care for my fistula site during showers or baths?

After the initial healing period, you can shower or bathe as usual but avoid scrubbing the fistula site directly. Use mild soap and lukewarm water to gently clean the area, ensuring it stays free from dirt or bacteria. After bathing, pat the site dry with a clean towel. If you are allergic, do not use creams, lotions, or powders over the fistula, as these have the potential to irritate the skin.

If I am not compliant with the diet advised to me, will my fistula fail?

While diet does not directly impact your AV fistula, a healthy diet plays a significant role in maintaining good blood flow and overall health. High cholesterol or diabetes can affect blood vessels and potentially harm your fistula. A kidney-friendly diet, low in sodium, potassium, and phosphorus, is recommended for dialysis patients. Staying hydrated also helps maintain good blood flow to the fistula.

What happens to the AV fistula after I get a renal transplant? Do I need to close it?

After a successful kidney transplant, the AV fistula may no longer be required for dialysis. In some cases, it can be left in place if it is not causing problems. However, if the fistula becomes enlarged, uncomfortable, or leads to complications like heart strain, your doctor may recommend a

surgical procedure to close it. Many patients choose to keep the fistula as a backup in case of transplant failure. In many cases, fistula gets blocked on its own after a renal transplant.

Will my life expectancy change after doing an AV fistula?

An AV fistula itself does not directly affect life expectancy. It is the most reliable and safest option for long-term dialysis, reducing the risk of infections and complications compared to other vascular access methods. Proper dialysis improves overall health and quality of life, which can positively impact life expectancy. According to studies, patients with well-functioning AV fistulas have fewer hospitalizations and complications, contributing to better outcomes. However, associated medical conditions like compromised cardiac status may influence life expectancy after an AV fistula procedure.

Section 4: Complications of AV Fistula

Does an AV fistula fail, and how often does this happen?

Yes, AV fistulas can fail, particularly in the early stages. This is referred to as primary failure, which means the fistula does not mature sufficiently for effective dialysis. Studies show that primary failure can occur in up to 40% of cases. Factors contributing to failure include poor vein quality, insufficient blood flow, and underlying health conditions like diabetes or vascular diseases. It is advisable to understand the potential for failure of fistula before surgery. This helps with better acceptance and preparation for alternative modalities in case of failure.

Why does my arm swell after AV fistula surgery and is it normal?

Postoperative swelling can occur after AV fistula surgery and typically resolves within a few weeks as the fistula matures. This can happen due to dependent position of your extremity, and because the veins are adapting to increased blood flow. However, if the swelling persists, worsens, or is accompanied by redness, warmth, or pain, it could indicate a complication such as infection, clot

formation, or venous hypertension. In case of persistent and prolonged swelling, keep your limb elevated and contact your doctor.



Swelling after AV Fistula

What is steal phenomenon, and how does it affect the arm and fingers?

Steal phenomenon occurs when the fistula diverts too much blood away from the hand, causing insufficient blood supply. The inadequate blood supply to the hand can result in symptoms like cold, pale fingers; pain; and, in severe cases, tissue damage or blackening of the fingers. It can occur in up to 1–20% of AV fistula patients. Treatment options range from conservative measures, like warm compresses and reducing fistula blood flow during dialysis, to surgical interventions for severe cases.



Steal phenomenon

What is an aneurysm? Can the fistula develop aneurysms postoperatively?

An aneurysm after AV fistula surgery refers to a localized, abnormal bulging or ballooning of the vein at the fistula site. It develops when the vein wall weakens and expands due to prolonged high-pressure blood flow within the fistula, often exacerbated by repetitive stress from needle punctures during dialysis.

Repeated needle punctures during dialysis can weaken the fistula walls, leading to aneurysms (true aneurysms) or pseudoaneurysms (localized outpouching of blood due to a wall defect). These are usually visible as bulges on the skin. While small aneurysms are often harmless, larger ones can rupture or clot, posing serious risks. Monitoring the size and appearance of the fistula and seeking medical attention for significant

changes are critical. Rotating the needle insertion site during dialysis can avoid repeated trauma to one area of the vein and can avoid possible aneurysm formation.



Aneurysm at Elbow level



Multiple aneurysms



Impending Aneurysm Rupture

What is venous hypertension, and how does it occur in AV fistulas?

Venous hypertension after AV fistula surgery is a condition where the venous pressure in the fistula arm becomes abnormally elevated. It typically occurs due to impaired blood flow out of the fistula, leading to venous congestion and complications in the affected limb. This condition can develop shortly after surgery or over time. There can be swelling, pain, discomfort, dilated veins, and even changes in skin color, including ulceration of the skin in severe conditions. Venous hypertension requires prompt medical attention, identification of the cause of the problem, and prompt intervention to prevent further issues.



Venous Hypertension

What should I do if my fingers become cold or numb after surgery?

Cold or numb fingers may be a sign of inadequate blood supply to the hand due to the fistula. This condition is often associated with steal phenomenon. Inform your doctor immediately, as early treatment can prevent further complications. Depending on the severity, interventions may include adjusting dialysis settings, medications to improve circulation, or surgical procedures to restore blood flow.

Can an AV fistula get infected?

Yes, although infections in AV fistulas are less common than in other dialysis access methods,

they can still occur. Signs include redness, swelling, warmth, pain, or discharge at the fistula site, as well as fever or chills. Treatment typically involves antibiotics, but severe cases may require surgical removal of the infected fistula.



Infected aneurysm with impending rupture

Are blood clots a common complication in AV fistulas?

Blood clots can form in an AV fistula, especially if there is a narrowing in the veins (stenosis) or if the blood flow through the fistula is insufficient. Clots can block the fistula, rendering it unusable for dialysis. Regular monitoring for changes in the "thrill" or bruit (a humming sound heard with a stethoscope) can help detect early signs of clotting. Treatments include clot-dissolving medications or surgical procedures to remove the clot.

What are the risks of poor fistula maturation?

Poor maturation, where the fistula does not develop adequate blood flow or size for effective dialysis, can occur in up to 40% of patients. Risk factors include small veins, underlying conditions like diabetes, and improper vein or artery selection during surgery. A failed maturation may require additional procedures, such as angioplasty or creating a new fistula.

What should I do if I notice swelling or pain near my fistula?

Swelling or pain near your AV fistula could indicate an issue such as an infection, blood clot, or narrowing of the blood vessels. It's essential to act promptly. Apply a cold pack wrapped in a cloth to reduce swelling temporarily, but do not delay contacting your doctor. Swelling and pain should never be ignored, as untreated issues can lead to complications like fistula failure. Early intervention can resolve most problems effectively.

What if there is spontaneous bleeding at the fistula site?

Bleeding from the fistula site can happen after dialysis or due to trauma. Apply gentle yet firm pressure using a clean gauze or cloth for at least 10–15 minutes to stop the bleeding. Seek immediate medical attention. Bleeding may be caused by overuse of the fistula, thinning of the

skin, or damage to the blood vessels, and timely care is crucial to prevent further complications.

How do I manage clotted or blocked fistulas?

If your AV fistula becomes clotted or blocked, it will stop functioning properly, which can disrupt dialysis. You may notice that the vibration (thrill) or sound (bruit) disappears. Contact your doctor immediately, so that attempts to salvage the fistula can be considered. Treatments often include procedures to remove the clot, such as catheter-based thrombolysis or surgery to repair the fistula. With early intervention, there is a possibility of clotted fistulas being restored to full functionality.

When should I contact my doctor?

Contact your doctor if you experience any of the following: persistent pain, redness, swelling, warmth, or discharge near the fistula site (possible signs of infection); loss of vibration or sound at the fistula; continuous bleeding; or a significant reduction in blood flow during dialysis. Also, notify your doctor if you notice signs of poor fistula maturation, such as a lack of enlargement or firmness weeks after surgery.

What should I do if my fistula stops working during or after dialysis?

If your fistula stops functioning during dialysis, inform your dialysis team immediately. This could

indicate a clot or other obstruction, or possibly very low blood pressure and the medical staff will take steps to address the issue. If you notice that your fistula has stopped working after dialysis (for instance, no thrill or bruit), contact your doctor or dialysis center immediately for evaluation. Quick action is essential to restore function and avoid the need for a new fistula.

How are issues with AV fistulas typically resolved?

Issues with AV fistulas are addressed depending on local facilities and availability of resources. Where facilities are available, many issues with AV fistulas, such as blockages or narrowing, can be resolved through minimally invasive procedures and interventional radiology. For blockages, a procedure called angioplasty can reopen the blood vessels. Where facilities are not available, the surgeon might open up the fistula site and try to remove the blockage/clot or address the stenosis. In case the fistula can't be salvaged, a new fistula must be considered. Infections are treated with antibiotics, and in severe cases, surgical drainage may be needed. Regular monitoring and follow-ups help detect problems early, allowing for timely intervention and maintaining the fistula's long-term usability.

Section 5: Alternatives to AV fistula

When is AV fistula surgery not possible?
AV fistula surgery may not be possible in patients whose blood vessels are unsuitable for the procedure. For instance, individuals with very small, scarred, or damaged veins and arteries often cannot have a fistula created. Conditions such as severe peripheral vascular disease (a condition affecting blood circulation, often linked to diabetes or aging) can also make it difficult to perform the surgery. Poor medical conditions like compromised cardiac status or any other unstable medical conditions may make surgery too risky.

What are the alternatives to an AV fistula?
When an AV fistula isn't an option, patients can consider other vascular access methods like AV grafts or central venous catheters/tunneled central venous catheters.

What are the pros and cons of an AV graft compared to an AV fistula?
An AV graft uses synthetic tube to connect an artery to the vein. An AV graft offers quicker usability for dialysis, typically within 2–3 weeks, compared to the months it takes for an AV fistula to mature. However, grafts have a shorter lifespan and are more prone to complications such as

infections and blockages. Fistulas, on the other hand, are more durable and have a lower risk of infection or clotting, making them the preferred choice whenever possible. Grafts can be a practical alternative for patients whose veins are unsuitable for creating a fistula, but they often require more maintenance and regular interventions to remain functional.

What is a central venous catheter, and when is it used?

A central venous catheter is a flexible tube placed into a large vein in the neck, chest, or groin. It provides immediate access for dialysis and is commonly used when there isn't enough time to wait for a fistula or graft to mature. While it's a lifesaving option in emergencies, it's not ideal for long-term use due to a higher risk of infections, clotting, and vein damage. For this reason, catheters are often a temporary solution while a more permanent access option, like a fistula or graft, is being prepared. A tunneled central venous catheter has a longer life than a conventional central venous catheter.

What types of dialysis are available, and how do they differ?

There are two main types of dialysis: hemodialysis and peritoneal dialysis. Hemodialysis filters blood outside the body through a machine, which then returns the clean blood to the patient. This method

is typically performed at a dialysis center. Peritoneal dialysis, on the other hand, uses the patient's peritoneum (the lining of the abdomen) as a natural filter. A cleansing fluid is introduced into the abdominal cavity through a catheter, and waste products are drawn out before the fluid is drained. While hemodialysis is generally more effective in severe cases, peritoneal dialysis offers greater flexibility and independence, as it can be done at home or even while traveling.

When should a patient consider kidney transplantation as an alternative to dialysis?

Kidney transplantation is a good alternative for patients who are medically fit for the procedure and can find a compatible donor. A transplant offers the potential for a better quality of life and eliminates the need for dialysis. The process involves finding a donor and undergoing major surgery. After transplantation, patients must take immunosuppressive medications to prevent organ rejection, which can have side effects and increase the risk of infections.

What role does new technology play in providing alternatives to dialysis?

Advances in technology are continually expanding the options available for managing chronic kidney failure. Innovations such as wearable artificial kidneys, which allow for continuous filtration of

blood, could one day revolutionize how dialysis is performed. Bioengineered or lab-grown kidneys are another promising area of research, potentially offering patients new options for organ replacement without the need for a donor. While these technologies are still in development, they offer hope for more convenient, effective, and less invasive treatments in the future.

How can patients and caregivers choose the best option for their situation?

Choosing the right treatment depends on several factors, including the patient's overall health, lifestyle, and personal preferences. A thorough discussion with your doctor is essential to weigh the pros and cons of each option and align the choice with the patient's long-term goals. For instance, an active individual may prefer peritoneal dialysis for its flexibility, while someone with more complex medical needs might find hemodialysis or a transplant more suitable. Understanding the available options and their implications is crucial for making informed decisions and achieving the best possible quality of life.

Section 6: Celebrities with CKD

Chronic kidney disease (CKD) is undoubtedly a challenging condition, but it is far from a reason to lose hope or motivation. Many individuals with CKD have demonstrated that with mental strength, proper care, and disciplined lifestyle management, it is possible to not only live but thrive. While the journey may require adjustments and resilience, countless people have found ways to overcome the limitations of the disease, achieving their dreams and living fulfilling lives.

The key lies in maintaining a positive outlook, adhering to medical advice, and focusing on what can be achieved rather than dwelling on obstacles. CKD does not define a person or limit their potential. It is inspiring to see how many individuals, even under the shadow of this condition, have excelled in their chosen fields—proving that with determination and support, the challenges of CKD can be met head-on.

As a testament to this spirit, the following section highlights some remarkable celebrities and achievers who have lived with CKD, demonstrating courage, resilience, and the will to succeed. Their journeys remind us all that life's difficulties can be

met with strength, and a bright, rewarding future is always within reach.

Indian Celebrities

1. **Manohar Parrikar**: The former Chief Minister of Goa battled health issues, including renal complications, during his political career.

2. **Anju Bobby George**: The celebrated athlete publicly acknowledged dealing with kidney-related health issues while maintaining her career in sports.

3. **Ustad Amjad Ali Khan**: The legendary sarod maestro underwent a successful kidney transplant, showcasing the possibility of resuming a vibrant life post-treatment (National Kidney Foundation)

Global Celebrities

1. **Selena Gomez**: The singer and actress underwent a kidney transplant due to complications from lupus nephritis, raising awareness about autoimmune-related kidney conditionsHealth Central.

2. **Stevie Wonder**: The music legend underwent a kidney transplant in 2019, demonstrating that even at an advanced stage of CKD, quality of life can improve significantly Health Central.

3. **Sarah Hyland**: The actress from *Modern Family* has had two kidney transplants due to kidney dysplasia, advocating for organ donation Health Central

4. **Sean Elliott**: The basketball player successfully returned to professional sports after a kidney transplant due to focal segmental glomerulosclerosis (FSGS)Health Central

5. **Nick Cannon**: The musician and television host has lupus nephritis, a condition that has affected his kidney health, and he actively raises awareness about CKDUKRO Health Central

6. **Natalie Cole**: The Grammy-winning singer underwent a kidney transplant after kidney failure linked to hepatitis CHealth Central

7. **Lucy Davis**: Known for *The Office*, she managed kidney failure and underwent a transplantHealth Central

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Section 7: Diet for Patients with Chronic Kidney Disease (CKD)

What should I eat?

For individuals with kidney problems, diet becomes an essential part of managing your health and preventing complications. The right foods and nutrients can help protect your kidneys and keep you feeling better. What you should eat depends on whether you are on dialysis or managing your condition without it. If you are not on dialysis, keeping your protein intake moderate is essential to reduce the load on your kidneys. High-quality protein options, like eggs, lean chicken, fish, or limited portions of lentils, are recommended. However, once you are on dialysis, your protein needs increase since some protein is lost during the treatment process.

You will want to avoid salt (sodium) as much as possible since it can lead to fluid retention and increased blood pressure. Swap out salty snacks and processed foods for fresh options and experiment with herbs and spices to flavour your meals. Potassium is another key focus—stick to low-potassium fruits and veggies like apples, berries, and cauliflower while cutting back on bananas, spinach, and other high-potassium

options if your potassium levels are elevated. Phosphorus can be tricky, too! Avoid processed foods like packaged snacks, cola, and processed cheese while choosing fresh, phosphorus-friendly items like rice milk, non-dairy creamers, and fresh fruits.

To stay energized, include healthy carbs like rice, whole grains (if recommended by your healthcare provider), and non-starchy veggies. Do not forget your healthy fats—olive oil, avocado, and a few unsalted nuts can make a significant difference. Iron-rich foods like lean meats and fortified cereals help combat anaemia, and your doctor might also prescribe calcium and vitamin D supplements since many natural calcium sources are high in phosphorus.

What should I avoid?

Some foods may seem harmless but can be quite problematic for your kidneys. Salty snacks, canned soups, pickles, and processed meats are loaded with sodium and should be avoided or eaten rarely. Foods like melons, tomatoes, potatoes, and other potassium-rich choices might need to be limited if your potassium is high. For phosphorus, chocolate, nuts, and sugary beverages like soda are often on the no-go list. And while it might be tempting to overindulge in fluids (especially juicy foods like watermelon or broths), those on fluid restrictions need to carefully track their intake.

How much water should I drink?
This varies for everyone! If you are not on dialysis, drinking enough to stay hydrated without overloading your kidneys is important. If you are on dialysis, your doctor will typically recommend limiting fluid intake, usually to 500–1000 mL plus the amount of urine you produce daily. Signs like swelling in the legs or shortness of breath can indicate too much fluid, so keep an eye on those symptoms.

Do I need vitamin or mineral supplements?
Yes, but only if prescribed by your healthcare provider. Many CKD patients need supplements like vitamin D, iron, or calcium to make up for dietary restrictions. However, avoid taking over-the-counter vitamins unless recommended, as some (like vitamins A, E, and K) can build up in your body and cause harm.

How should I prepare kidney-friendly meals?
Meal preparation does not need to be complicated. For vegetables, try peeling, chopping, soaking, and boiling them to lower their potassium content—and always toss out the cooking water. Instead of salt, experiment with herbs, spices, garlic, or a splash of lemon juice for flavour. Opt for fresh or frozen ingredients whenever possible, and if you

must use canned items, rinse them thoroughly to reduce sodium.

Does dialysis affect my diet?
Yes, dialysis changes your nutritional needs. You will often need more protein to make up for what is lost during treatment, and stricter monitoring of potassium, phosphorus, and fluid intake will become part of your routine. Work closely with your dietitian to adjust your meals accordingly.

Can I eat foods from my culture or region?
Absolutely! CKD diets can be personalized to include your favourite cultural or regional dishes. Swap high-potassium and high-sodium ingredients for kidney-friendly alternatives. For example, if a dish traditionally uses salted condiments or high-potassium vegetables, explore creative substitutions while still enjoying the flavours of your heritage.

How can I manage thirst if fluid intake is restricted?
Managing thirst can be challenging, but small tricks can help! Use smaller cups to limit portions, suck on ice chips or frozen low-potassium fruits, or keep sugar-free candies handy to reduce dryness in your mouth. Avoid salty or spicy foods, which can make you thirstier.

How do I stay motivated with dietary restrictions?

Variety is the spice of life, even on a restricted diet! Try renal-friendly recipes, experiment with new foods, and focus on all the delicious meals you *can* enjoy. Staying connected with support groups or others on a similar journey can make it feel less isolating. Remember that sticking to your diet is not just about restrictions—it is about improving your quality of life.

How do I handle eating out?

Eating out can still be enjoyable if you plan ahead. Check menus in advance, and when ordering, ask for low-sodium or sauce-free options. Choose smaller portions and low-potassium sides, like steamed veggies, and avoid deep-fried dishes or those drenched in butter or cream.

How can I read food labels effectively?

Check for labels that say, “low sodium” or “no added salt” and avoid anything with phosphate additives or high potassium content. Pay attention to serving sizes to ensure you do not unintentionally exceed your limits.

What should I do during emergencies or while traveling?

Planning ahead is your best strategy. Pack renal-friendly snacks like unsalted crackers or low-potassium fruits, and scope out renal-friendly food

options at your destination. Stay mindful of your fluid intake and avoid salty emergency foods.

Are there tools to help manage my diet?
Absolutely! There are apps designed specifically for CKD patients, offering recipes, nutritional advice, and meal tracking. Consulting with a renal dietitian is also invaluable for personalized guidance.

How can I balance dietary restrictions during special occasions?
Enjoying festive meals is possible with some planning. Use kidney-friendly substitutions in your favourite dishes, control portions, and prioritize naturally low-potassium, low-sodium options on the table.

Navigating Dialysis
The AV Fistula Handbook

Dialysis can be overwhelming, but with the right knowledge, patients and caregivers can confidently navigate the journey. This comprehensive yet easy to read book answers the most pressing questions about AV fistulas and dialysis.

Learn how to:

- Prepare for dialysis and AV fistula surgery
- Care for your fistula to improve longevity
- Prevent complications and recognise warning signs
- With clear, practical advise, the book empowers you and your loved ones to take charge of dialysis care, ensuring a smoother, healthier experience with confidence and peace of mind.

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