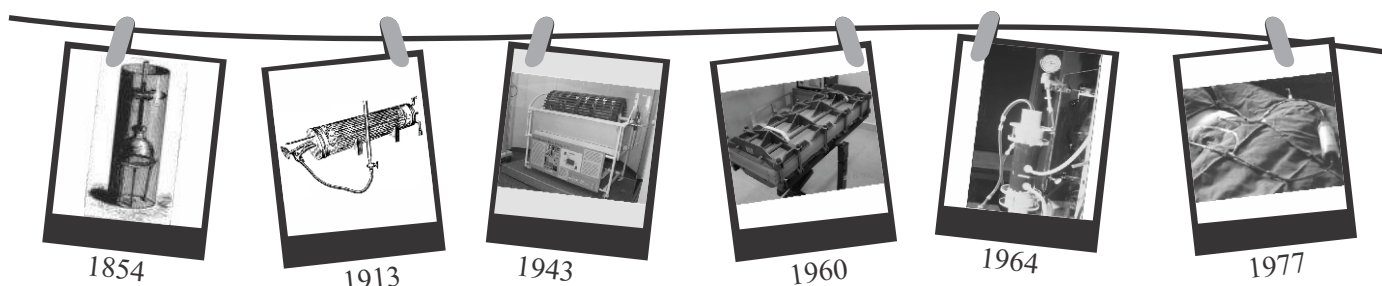
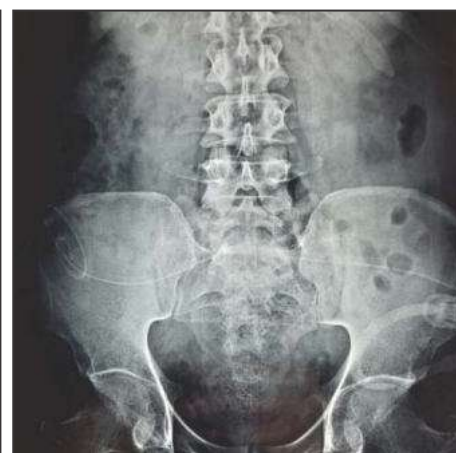
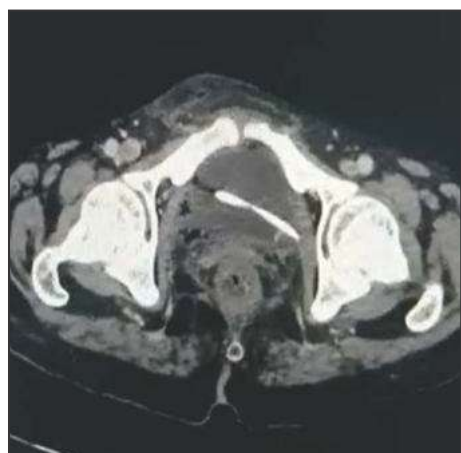


KIDNEY KOLUMNS

Freely filtered from the ISN



Dear Readers,

Welcome to another exciting Kidney Kolumns edition! We've delved into the world of dialysis, exploring often-overlooked conundrums, modalities, patient experiences, and innovations, offering a fresh perspective. In this issue, a special feature takes us beyond Nephrology. A Kidney warrior shares insights into the cricket world cup, combining sports passion with resilience in the face of kidney-related challenges. Don't miss our popular Crossword, testing your dialysis knowledge. Your feedback motivates us in our mission of knowledge sharing. Share your comments, criticisms, or compliments at education@isn-india.org. We look forward to hearing from you and hope you enjoy this edition as much as we do!

Warm regards,

Editors-in-Chief

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KIDNEY KOLUMNS

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COVER IMAGES :

Image 1,2 - Straight PD catheter wrongly inserted into urinary bladder as seen on CT Scan KUB axial image (Left) and cystoscopy (Center).

Image 3 (Right) - Migrated Coiled PD catheter lying in right upper quadrant.

Images on Photo Frames - Bulb Dialyzer (Thomas Graham), Vividiffusion Apparatus (Abel & Colleagues), Rotating Drum Dialyzer (Kolff), Kiil Dialyzer, First Hollow Fibre Dialyzer, First CRRT.

Image Credits

Image 1 & 2 - Dr Pavitra Manu Dogra, Professor, Nephrology, Army Hospital (Research and Referral), New Delhi

Image 3 - Dr Vineet Behera, Consultant Nephrologist, INHS Kalyani, Visakhapatnam

Hon. Secretary's Message



Dear Members,

Greetings from the secretariat!

The ISN is coming out with the third issue of the newsletter. The initial 2 issues were greatly appreciated by everyone. I would like to congratulate the whole editorial team for doing this fantastic job.

I will take this opportunity to highlight some of the important activities done recently and future plans by Indian SN:

1. Indian SN did a webinar on Green Nephrology on 29th September with the help of ISN and had Dr Carolina Stingent from Canada, Dr Suren Kanagasundaram from UK and Dr Vivekanand Jha from India as speakers, who discussed the effect of climate change on the increasing prevalence of kidney diseases, and how the kidney care is associated with an increase in carbon emissions. The speakers and panellists also elaborated on what measures we can take to reduce the effects of kidney care on the environment including waste disposal, reuse of wastewater in hemodialysis units, promoting home dialysis and Kidney transplantation. The webinar was well attended and appreciated by members.

2. The Indian SN is committed to increasing research in India, and this year we received 23 applications for the La-Renon Research grant from young researchers in India. After reviewing the projects, the committee recommended the 4 best projects and the secretariat increased the grant numbers from 3 last year to 4 this year to encourage more young researchers. The winner of the grants have been conveyed the same.



3. I would like to invite everyone to ISNCON 2023 Kolkata from 14th-17th December in Hotel ITC-Royal. This year, there is a unique opportunity for students and early career nephrologists to improve their skills and knowledge in various workshops like intervention nephrology, critical care nephrology, acid-base balance, Histopathology, Genetics, and Scientific writing workshops. Registration in these workshops is complementary to those registered with the conference. There are 3 workshops in the morning and the rest 3 in the evening time. Any delegate can choose one in the morning and another in the evening.

4. The ISNCON International faculty this time has experts in all fields including dialysis, transplantation, glomerular diseases and so on. Do not miss this opportunity to upgrade your knowledge and at the same time have social interaction with your friends and colleagues in the biggest Nephrology meeting in India.

Highlights of ISNCON 2023

1. **Workshops on -**
 - a. Intervention nephrology,
 - b. Critical care nephrology,
 - c. Acid-base and electrolytes,
 - d. Histopathology,
 - e. Genetics and Kidney Diseases, and
 - f. Scientific writing workshops.
2. **Dedicated sessions on -**
 - a. Recent advances in the Management of Glomerular Diseases,
 - b. Toxins and Kidney,
 - c. Contemporary Issues in Dialysis,
 - d. Nephrolithiasis, UTI and Imaging and
 - e. Practise changing updates on recent trials in Nephrology.

International faculty ISNCON 2023 :

Dr Dorry Segev, Dr Camille N Kotton, Dr Michelle Josephson, Dr Ajay Singh, Dr Jonathan Barratt, Dr Amit Garg, Dr Prabir Roy Chaudhary, Dr George Bakris, Dr Graham Lipkin, Dr Ajay Sharma, Dr Sandip Mitra

Dr Shyam Bihari Bansal

Hon. Secretary

Indian Society of Nephrology

Webinar on Green Nephrology

GREEN-K WEBINAR

Indian Society of Nephrology

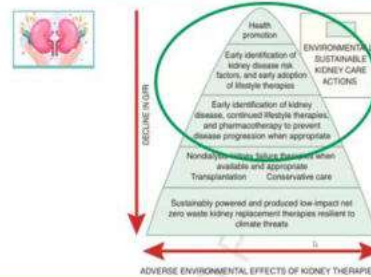
'How Eco-Unfriendly Is CKD Care?'

September 29, 2023

DR. CAROLINE STIGANT

CAROLINE.STIGANT@ISLANDHEALTH.CA

Environmentally Sustainable Kidney Care Is Good Patient Care
Optimal outcome = lowest cost = lowest environmental impact



Stigant C et al. KI 2023 Jan 12

Kidney – The victim of climate change and environmental pollution

VIVEKANAND JHA



Kidney specific co-benefits of mitigation strategies



Northern Centre for Cancer Care and Renal Services Centre

Sustainable Kidney Care: the UK perspective

29th September 2023

Suren Kanagasundaram
Newcastle Hospitals
UK Kidney Association

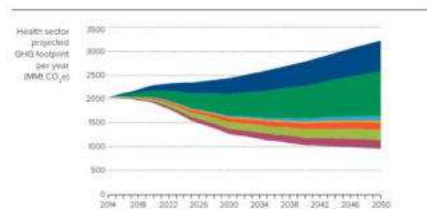


Figure 6. Reduction in health sector emissions between 2014 and 2050 enabled by the seven high-impact actions. This details a segmentation of the purple wedge shown in Figure 1, above.



ISN JOURNAL CLUB

**INDIAN SOCIETY OF NEPHROLOGY
MONTHLY JOURNAL CLUB 2023**

Balanced crystalloid solution versus saline in deceased donor kidney transplantation (BEST-Fluids): a pragmatic, double-blind, randomised, controlled trial.
MG Collins et al. Lancet, Jun 2023.

Presented by

Dr. Vipul Prakash Sanghavi
KEM, Pune

Dr. Shyam B. Banshal
Dr. Dharshan Rangaswamy
Dr. Arunkumar Subbiah

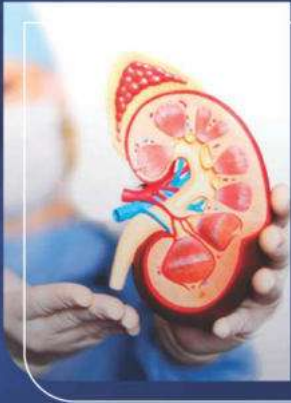
Panelists

Dr. Sishir Gang
Nadiad

Dr. Tukaram Jamale
Mumbai

Statistical inputs by Dr Jay Tripathi, AIIMS, Nagpur

16th August 2023
08:00-09:00 PM IST
Virtual Meeting



**INDIAN SOCIETY OF NEPHROLOGY
MONTHLY JOURNAL CLUB 2023**

Donor-Derived Cell-Free DNA and Active Rejection in Renal Allografts.
Fernando E et al. IJN 2023

Presented by

Dr. Gauri Kalbore
Medanta, New Delhi

Dr. Shyam B. Banshal
Dr. Dharshan Rangaswamy
Dr. Arunkumar Subbiah

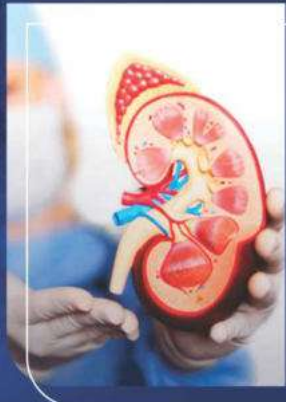
Panelists

Dr. S. K. Agarwal
New Delhi

Dr. Narayan Prasad
Lucknow, Uttar Pradesh

Special invitee: Dr Edwin Fernando, Stanley Medical College, Chennai

20th September 2023
08:00-09:00 PM IST
Virtual Meeting



**INDIAN SOCIETY OF NEPHROLOGY
MONTHLY JOURNAL CLUB 2023**

Severe Hyponatremia Correction, Mortality, and Central Pontine Myelinolysis.
Seethapathy H et al. NEJM Evid Sep 2023

Presented by

Dr. Praveen G
Manipal Hospital, Bangalore

Dr. Shyam B. Bansal
Dr. Dharshan Rangaswamy
Dr. Arunkumar Subbiah

Panelists

Dr. Gopalakrishnan N
MMC, Chennai

Dr. Ravindra A Prabhu
KMC, Manipal

Author invite: Dr Harish Seethapathy & Dr Sagar Nigwekar
MGH and Harvard Medical School, Boston

18th October 2023
08:00-09:00 PM IST
Virtual Meeting



President International Society of Nephrology's Message



A tale of two Kidney Societies : A Robust Collaboration

From humble beginnings to ISNCON2023 Kolkata and WCN2025 New Delhi, two kidney societies walk the path together to advance kidney health in South Asia and globally.

I'm truly looking forward to speaking at the 53rd ISNCON2023 in Kolkata in my role as president of the International Society of Nephrology (ISN). The ISN and the Indian Society of Nephrology have forged a robust partnership to improve kidney health and expand nephrology education in India and the broader South Asia region.

Uniting for kidney health: Joint initiatives making a global impact

This collaboration, initiated in 2015, represents a joint commitment to fostering kidney disease prevention, diagnosis, and treatment. We have joined forces on many programs and initiatives, from [Fellowship](#) training, [Sister Centers](#) and [Interventional Nephrology Scholarships](#) to joint [CME](#) meetings, [Scientific Writing Courses](#) and congress sessions.

New Delhi welcomes the world: WCN'25 anticipation

This partnership is approaching an exciting milestone in 2025: Together, the ISN and Indian Society of Nephrology will host the World Congress of Nephrology in New Delhi. We look forward to bringing the ISN's international community to New Delhi for what I know will be an unforgettable experience.

Dr. Masaomi Nangaku
President International Society of Nephrology



Game on and Kidneys Strong : Nephrology on the Cricket Pitch

Cricket fever is in the air and with lots of doctors who are cricket crazy like any other Indian, I thought I would pen my thoughts for Kidney Kolumns, the newsletter of the Indian Society of Nephrology about my associations with cricket and nephrologists. I have been associated with the field of nephrology for the past 23 years as a CKD patient. As a former Tamilnadu Cricketer who has also undergone 2 kidney transplants, had 2 open heart surgeries for aortic dissection (type A) and stenting, VATs for lung infection, cataracts and many more, I am uniquely positioned to talk about the influence of cricket and sports on my life as a kidney warrior.

My cricketing journey started like any young kid playing street cricket with rubber balls after the 1983 World Cup when Kapil's Devils defeated the ruthless almighty West Indies team. It was a typical story of David vs Goliath. Those were the days when we listened to cricket matches on the radio, and my dream to play cricket turned into a passion and eventually a profession as I represented Tamilnadu in junior and senior cricket until I had a bout of severe dehydration and NSAID-induced AKI shortened my cricketing career and very soon, the dream and opportunity to play for the country became a distant one thanks to ignorance of CKD and sports in India.

However, this setback led me on a mission to create awareness about health and preventive measures through lifestyle modifications. I became a wellness consultant, a strength and conditioning trainer for aspiring athletes, post rehabilitation patients, etc until a severe bronchitis attack led to my ESRD and I was soon on dialysis for almost 2.5 years. My life path took some huge turns leading to innumerable surgeries, a failed transplant, aortic dissection etc. But the one thing I managed to continue irrespective of my hardships was

playing multiple sports, exercise, dancing and running to keep my sanity.

Sports taught me major lessons which I incorporated in every moment of my life. The most important learning which I would like to share with the community is that "Life is like a game. Some days we win, some days we lose. What matters the most is how well you play to the best of your abilities on that day." Hence setbacks and opportunities go hand in hand and this works only if one has Awareness and Acceptance and can Adapt and Act.

This is my secret recipe which I try to remind myself every single day to value and overcome any situation. As the famous Master Oogway says: "Quit, don't quit... Noodles, don't noodles... You are too concerned about what was and what will be. There is a saying: yesterday is history, tomorrow is a mystery, but today is a gift. That is why it is called the present."

I will fail in my duties if I don't mention how my nephrologists and other doctors changed my perspective and guided me throughout my journey. They helped me to continue playing cricket when the system was against me playing. These doctors healed and treated my soul and not just my body or my disease. I hope my story inspires more patients with chronic kidney diseases to pursue an active lifestyle with the incorporation of sports or some form of physical exercise into their schedule if possible and also encourages their doctors to have a conversation with them regarding this.

Coming back to the cricket World Cup, let me address the million dollar question on all our minds - Will India win the World Cup? My personal opinion is that the most likely semifinalists are England, Australia, South Africa or New Zealand, and India. Pakistan has an outside chance. For India, favorable playing conditions

and being on home turf provide a good chance to win the World Cup for the third time, provided key players like Bumrah, Ashwin, and an all-rounder perform at their best to make the biggest impact for our team. Irrespective

of what eventually happens, I envision that, in the next few weeks, cricket would unite doctors and patients in front of TVs and phones in the midst of busy OPDs and wards.



Mr. Sumeer is a multi-talented individual who works as a wellness consultant and motivational speaker and is also involved in patient advocacy for prevention of chronic diseases with the Kidney Warriors Foundation (KWF). He has a place in the Asian and Indian Book of Records for completing 10 km within 100 days of undergoing surgery. He has also had the honor of representing Team India in the World Transplant Games, Perth 2023 in Badminton and Tennis.

Stay Tooned !



by Dr Anand Chellappan

The views and opinions expressed in the cartoon (Stay Tooned) are that of the cartoonist and not that of his/her employer.

CONVINCE Trial: Is it convincing in the real-world ?

Hemodiafiltration (HDF) has long been a subject of interest and debate in the field of renal replacement therapy (RRT). [Blankestijn et al.](#) in the latest issue of NEJM attempted to solve the question of whether high-dose HDF provides a mortality benefit compared to high-flux hemodialysis (HD) in a pragmatic, multinational, randomized controlled trial (RCT). The trial randomized 1360 individuals, 683 to high dose HDF and 677 to high flux HD. Over a median follow-up period of 30 months, the authors reported that the incidence of the primary outcome, which was death from any cause, was 17.3% among patients receiving high-dose HDF and 21.9% among those receiving HD (hazard ratio, 0.77; 95% CI, 0.65 to 0.93). Surprisingly, no significant difference was observed in the risk of cardiovascular mortality between the two cohorts, given that the composite endpoint of fatal or nonfatal cardiovascular outcomes was similar. The mortality for infection was found to be higher than the mortality for cardiovascular diseases in both the study groups. Furthermore, it is worth noting that a significant decline in mortality related to infections was observed in the high-dose HDF group. This is in stark contrast with the results of a recently published [meta-analysis](#), which indicated reduced mortality associated with infection in the high-flux HD group rather than HDF. The risk of recurrent hospitalization, including nonfatal and infection-related hospitalizations, was similar in both groups.

CONVINCE study differs as compared to the majority of prior RCTs. Inclusion criteria holds the key. CONVINCE selected only patients who were able to attain convection volumes of ≥ 23 litres/session. The baseline characteristics of the population exhibited a healthier profile, which is typically not observed in routine clinical practice. Over 80% of the population had arteriovenous fistula, less than 40% were diabetic, the mean body mass index in the HDF group was 27.4 kg/m^2 , less than 25% had coronary artery disease, and patients had already undergone high-flux HD for a minimum of 3 months. A low dropout rate in both groups was reported. In clinical practice, the convective volume in post-dilution HDF is influenced by determinants related to both the patient and the treatment. We postulate that, patients with improved vascular access, may confer a survival benefit, by achieving better convection volumes.

The study lacks in reporting [beta-2 micro](#) globulin levels and [residual renal function](#) data (missing for

89% patients), both of which are known to impact outcomes. There was also a lack of impartial committee to avoid bias in event assessment. Besides, issues related to ecology of HDF were not discussed. However, one of the virtues of the study is the presence of comparable distributions in demographic factors, including age, gender, residual kidney function, type of access, smokers, and the inclusion of patients with diabetes and underlying cardiovascular disease in both groups. This study incites the implementation of patient-centered outcomes and the assessment of the economic and practical viability of HDF in global contexts, particularly in low-and middle-income countries. We look forward to the unanswered question on effect on health-related quality of life and cost effectiveness in the Haemodiafiltration versus High.flux Haemodialysis Registry Trial ([H4RT](#)). The primary outcome measure of the trial is mortality, while patient-reported outcomes and economic evaluation have also been integrated into their trial designs.

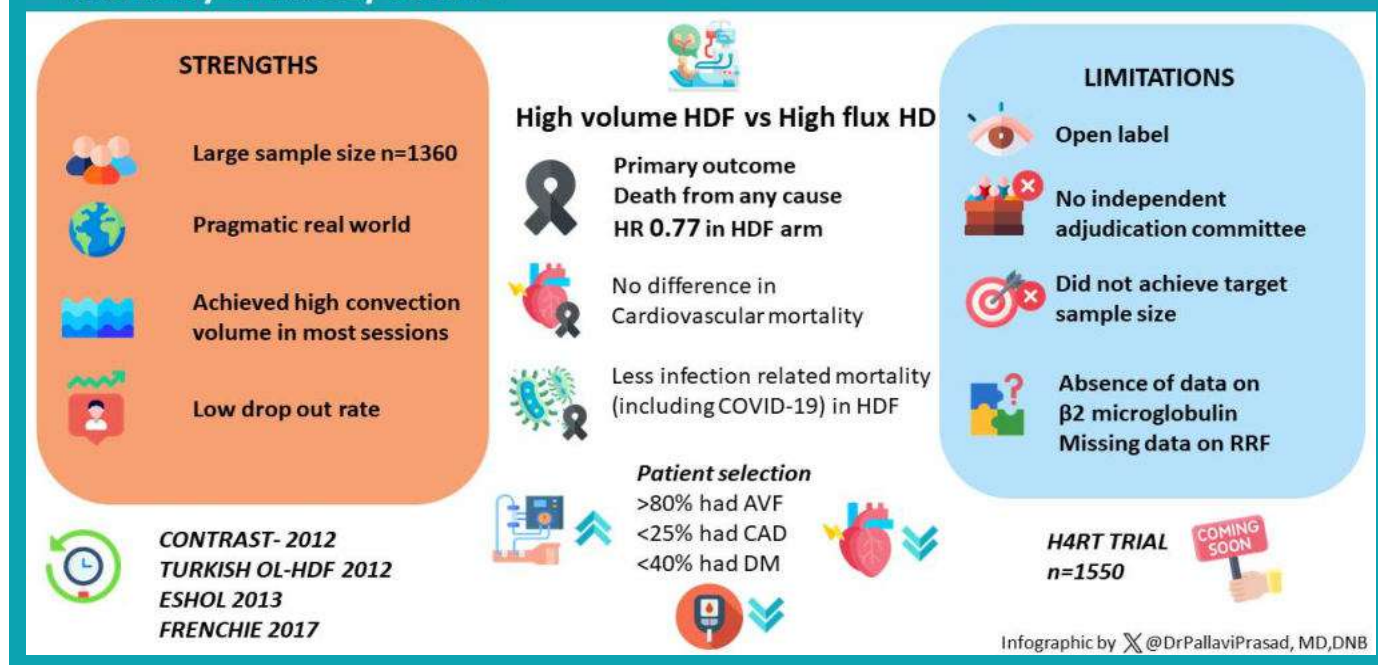
Vinant Bhargava

Associate Professor, Department of Nephrology,
Sir Gangaram Hospital, New Delhi, India

Aakash K Shingada

Nephrologist and Transplant Physician, Director,
Kidney Associates Pvt. Ltd., Mumbai, India

THE CONVINCe TRIAL : Effect of Hemodiafiltration or Hemodialysis on Mortality in Kidney Failure



The Diagnosis of Heparin Induced Thrombocytopenia - How to HIT the Bull's Eye ! - The First Study from India

“One often meets his destiny on the road he takes to avoid it”- *Master Oogway, Kungfu Panda*.

And Jay Mclean, a second-year medical student at John Hopkins was no exception to it!! When Prof William Howell assigned him the task of identifying the principal component in a number of substances that could be proven to have thromboplastic effect, [McLean](#) discovered (in his words), “The cuorin (from heart) on the contrary when purified by repeated precipitation in alcohol at 60°, has no thromboplastic effect—indeed it possesses an anticoagulating power as may be illustrated by the following experiment...”

Heparin-induced thrombocytopenia (HIT) is a serious and life-threatening adverse effect of heparin medication, presenting classically yet paradoxically with thromboembolism and thrombocytopenia. The incidence of HIT was reported to be around 5.6%, by [Kotwal et al](#), in India. [Yamamoto et al](#), reported the incidence to be 0.6%–3.2% in hemodialysis patients. As a general rule, unfractionated heparins (UFH) cause

more problems than low molecular weight heparin (LMWH) products. However, more often than not, underlying patient variables may contribute to risk more so than the particular product.

The term "heparin-induced thrombocytopenia" refers to a drop in platelet count that occurs during exposure to heparin or just after. There are two distinct forms of HIT. The first type of HIT is benign and has no elevated risk of thrombosis; it was once known as heparin-associated thrombocytopenia. Although the HIT type I mechanism is still unknown, it is most likely non-immune and possibly connected to its platelet pro-aggregating impact. Up to 10% of heparin-treated patients can develop this type of HIT, which is characterised by a mild, transient, and asymptomatic thrombocytopenia (rarely less than 100,000 platelets/ μ L) that disappears quickly after the heparin is stopped (typically within the first two days). HIT type II, the second type of HIT, is immune-mediated and linked to a risk of thrombosis. To avoid confusion between the

two disorders, it has lately been suggested that the terms "HIT type I" and "HIT type II" be replaced to "non immune Heparin Induced Thrombocytopenia" and HIT respectively.

In a patient with suspected HIT, the initial assessment is done using '[4T score](#)' and as per the [American Society of Hematology guidelines 2018](#). Low T scores (0-3) have a high negative probability whereas T score ≥ 4 must be evaluated by both immune and functional assays. In a study published earlier this year, [Sivapraksham Y et al](#), described five cases of confirmed HIT in the setting of hemodialysis over a period of 5 months, with reported incidence of 0.63% in their study. The series included patients with T score ≥ 4 and the diagnosis was confirmed by Heparin-induced Platelet aggregation test (PAT). Two deaths occurred amongst the five cases discussed in this series, of which one was related to the primary disease (pulmonary hemorrhage in double positive anti-GBM, and ANCA-associated vasculitis) and the other due to pulmonary embolism attributed directly to HIT.

When heparin binds to the platelet surface, positively charged platelet factor 4 released from α granules of activated platelets binds to negatively charged heparin forming heparin-platelet factor 4 complex (HPF4), which in turn binds with endothelial proteins. The binding of IgG antibodies to neoepitopes on HPF4 complexes crosslink Fc γ receptors on platelets and monocytes leads to their activation and thrombin generation, which presents as thrombocytopenia and thromboembolism.

Laboratory tests for HIT include immunoassays and functional assays. Immunoassays (ELISA and Gel-

card) detect anti-HPF4 antibodies with higher sensitivity (~85%). Functional assays, such as serotonin release assay and PAT, are only accessible in referral centres but have a high specificity (100%) in detecting platelet-activating anti-HPF4 antibodies.

Treatment involves discontinuing heparin and switching to a non-heparin anticoagulant such as fondaparinux, argatroban or direct thrombin inhibitors (DTI). Since protein-C shortage worsens the procoagulant state and leads to gangrene, warfarin should never be administered during the acute phase of the disease. Following a normalisation of the platelet counts, warfarin can be started. After reaching the target INR, it is overlapped with DTI for at least 5 days before DTI is stopped. In HIT without and with thrombosis, 4 and 12 weeks of therapy are indicated, respectively. Unless there is uncontrollable bleeding, platelet transfusion should be avoided. Re-exposure to heparin should be postponed for at least three months.

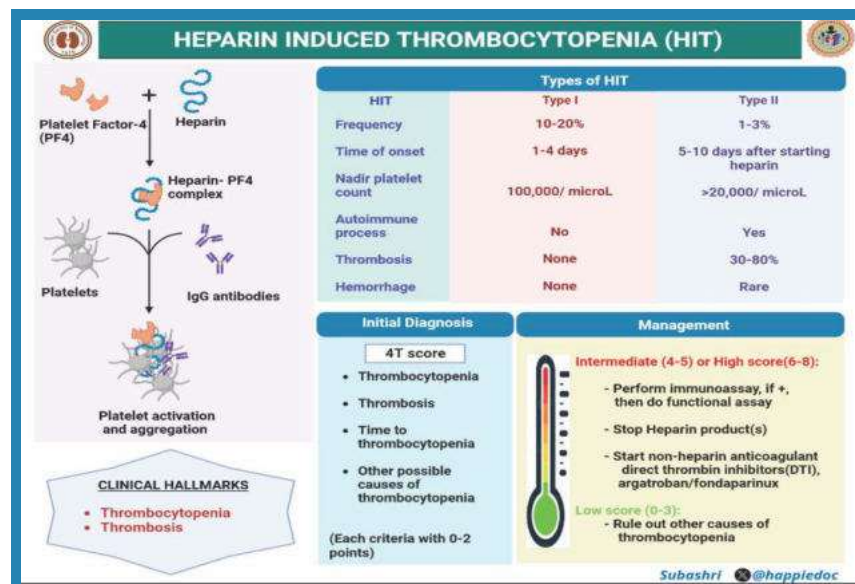
If left untreated, HIT definitely leads to increased morbidity and mortality. This strongly implies the need to have a low threshold of suspicion to diagnose and treat HIT in patients on hemodialysis. However, the quandary that still lingers is how frequently should we be testing platelet counts in patients regularly exposed to heparin during hemodialysis, before they develop this condition and reality hits us hard??

Isha Tiwari

MD,DNB,DM

Assistant Professor, Nephrology

MGM Super-Speciality Hospital,Indore







The effect of different hemodialysis taping styles on reducing chances of venous needle dislodgement

An AV fistula or AV graft needs to be needled during hemodialysis to access the blood flow. Sometimes fistula/graft needles may fall out resulting in bleeding, i.e., venous needle dislodgement (VND). At usual HD blood flow rates this may lead to catastrophic loss of blood volume and hemorrhagic shock. Factors leading to increased risk of VND include a poorly secured access (improper taping of access tubing to skin, loose Luer-lock tubing connection, blood lines not looped loosely or short needle length i.e., < 2.5 cm) or excessive movements of arms and body due to patient conditions like confusion, hypotension, diaphoresis, pruritis or non-adherent skin. VND may result in increased cost of health care due to emergency admissions, ICU care, blood transfusions and erythropoietin administration. Up to 75 percent of patients on dialysis have at least one episode of VND and while VND episodes may not be immediately life threatening in the presence of adequately trained staff, it appears that VND episodes are likely underreported, with a majority of them being near missed events. Also, venous pressure alarms are not always reliable because these may continue sensing the pressure created by the needle flow resistance, even when the needle is partially or fully dislodged.

Taping techniques may not always meet the recommended best practices and centers may not have

any guidelines regarding the training of the new staff. Such discrepant clinical practices put the patient at a risk of VND. For fistula needle taping, the butterfly or chevron technique is widely recommended by expert nurses, i.e., a chevron of tape to anchor the needle must be there to prevent any pulling or jerking on the tubing.

In a study by [Chan et al](#), the Chevron, butterfly and overlapping tapping techniques were tested in a mechanical engineering laboratory to determine the forces that each method could withstand. This was done by development of a mathematical model of dialysis in normal conditions and analytical strength comparison of each taping method was conducted. The experimental set up had a bloodline, needle set up and weighting attachment via a pulley. Synthetic leather was used to simulate patient's skin. Initially, all taping styles were tested with a minimum mass of 29 g, to test for baseline holding capacity. Thereafter, by incrementally increasing the hung mass, the force threshold of each taping pattern was calculated using laboratory weights to produce the force with a final test conducted at 3000 g, to compare how each tape withstands heavy impact forces (such as agitated patients). All the tested taping styles were shown to have an adhesive force stronger than the inherent force from the venous jet flow of blood but the overlapping style was found to have insufficient capability beyond this. Both the butterfly and Chevron

Hemodialysis taping styles and their effect on reducing the chance of venous needle dislodgement			
Material and methods Taping techniques: <u>Chevron</u> , <u>Butterfly & Overlapping</u> Analytical strength comparison in mechanical engineering lab	All 3 taping styles could withstand baseline mass - 29 g for 24 hr Weights increased → all 3 taping styles tested for a 240 min period with increasing weights 👍 Chevron and butterfly better → Increased adhesive contact SA → secondary latent resistant force		
	CHEVRON 	BUTTERFLY 	OVERLAPPING 
Experimental analysis <ul style="list-style-type: none"> Standard dialysis bloodline set Fresenius 15G venous needle Synthetic leather attached to benchtop surface to simulate patient skin Needle secured using 35 cm X 3 cm micropore tape Increasing hung mass- force threshold of each taping technique calculated 			
	👍 Superior strength, longer avg trial Resist forces applied in the entire planar dimensions Quick tape removal at high load- unlike butterfly Suited best for in care patients with erratic movements	👍 Ability to prolong dislodgement → more time for alarms Resists both long duration and heavy forces Suited best for home dialysis	👎 Only one sided adhesive grip Not capable of resisting potential erratic movements Only able to resist low movements & induced jet force Not recommended
VA by Dr. Kavita Vishwakarma MD,DM @Kavitasv20 Dominic Y F Chan et al. Semin Dial.2021 May; 34(3):218-223			

style of taping showed excellent holding capability, with elongation of dislodgement seen for the butterfly style, and slightly stronger hold noted for the Chevron style. Therefore, the Chevron or butterfly style should be the preferred method for dialysis needle taping, with the butterfly better suited to home dialysis (where monitors may be used) and the Chevron better suited for in-care patients with sudden unpredictable movements. The overlapping style is not recommended for use. Furthermore, a survey of dialysis nurses can shed light on the prevalent taping styles used in Indian settings. Also, real-world observational studies of taping styles, patient-

related outcomes such as comfort during taping and subsequent removal, and tolerance of different taping styles in hot and humid environments, are some of the aspects, that this mechanistic study does not address. Nonetheless, the clear win-win of the butterfly and Chevron styles, behoves us to modify our taping strategies and test these in our real-world settings.

Dr. Kavita Vishwakarma

Consultant Nephrologist,
Bhaktivedanta Hospital & Research Institute,
Thane, Maharashtra

Bioimpedance guided ultrafiltration in hemodialysis - Does it preserve residual kidney function?

Preserving residual kidney function (RKF) and achieving normal volume status are recognized as two linked and critically important predictors of survival in dialysis patients. There are considerable variations in practices related to volume management in end-stage kidney disease patients on dialysis.

Removing too much fluid during dialysis, by setting a low target weight for the end of a dialysis session, could accelerate RKF loss. Applying a strategy that avoids excessive fluid removal is associated with better-than-expected preservation of kidney function.

Bioimpedance (BI) is frequently used in HD units to monitor fluid status and body composition. There is evidence that overhydration and loss of lean tissue mass, measured using BI, are associated with shorter survival. BI generates the normally hydrated weight (BI-NHW) by modelling what the weight would be if the tissues (muscle, fat, and interstitium) were normally hydrated.

A randomized controlled trial done by [Onofriescu et al](#) showed BI-based fluid management reduces arterial stiffness, blood pressure, volume overload and all-cause mortality. The main limitation of this study was the small sample size and it was underpowered regarding mortality outcomes.

The [COMPASS](#) clinical trial evaluated the usefulness of bioimpedance spectroscopy (BIS)-guided fluid management for preserving RKF and cardiac function in dialysis patients. It concluded BIS did not provide additional benefits in volume control, and RKF preservation. This study included only incident peritoneal dialysis patients. Hence its results cannot be generalized.









[William Beaubien Souligny et al](#) performed a systematic review and meta-analysis of randomized controlled trials that compared fluid management guided by technological adjuncts to standard care in dialysis. Though BI conferred a reduction in systolic arterial pressure, it did not demonstrate an impact on mortality and other outcomes. Clinical heterogeneity and shorter follow-up periods are the main limitations of this meta-analysis.

The [BISTRO](#) (Bioimpedance Spectroscopy to maintain Renal Output) trial was recently published and it addressed the limitations of the above-mentioned studies. It was done to establish whether knowledge of the estimated normally hydrated weight from bioimpedance measurements (BI-NHW) while setting the post-hemodialysis target weight (TW) will help to mitigate the rate of loss of RKF compared to clinical assessment with a standardized protocol.

This was an open-label, longitudinal, randomized(1:1) controlled trial in incident hemodialysis patients. For the patients randomized to the intervention arm, the BI-NHW could be used in addition to clinical judgment. For patients in the control arm, the TW was set using clinical judgment only. The main primary outcome of interest was RKF, measured both as a time to anuria (defined as <100 ml/d or <200 ml of urine volume in the short interdialytic period, confirmed with a follow-up measure at 2 weeks) and as the rate of decline in measured GFR. A total of 437 people from 34 dialysis centres took part in this randomized trial for up to 2 years. At the end of 2 years, there was no statistically significant difference in the primary outcome (anuria) between the intervention (BI) and control (fluid management

protocol) groups. There was also no difference in the rate of decline in RKF between groups. There are a few limitations to this study. They were not able to recruit to the initial target. The trial was interrupted by COVID-19, with some loss of data and there was a significant dropout rate in the trial.

In conclusion, clinical judgment and experiences are important drivers of patient outcomes. BI does not add value to fluid assessments designed to preserve RKF. It increases the cost of dialysis without any additional meaningful benefit. BI can be tried in units without any standardized protocol for TW assessment. In the era of artificial intelligence, health technology like BI cannot supersede clinicians' clinical acumen.

 Bioimpedance guided ultrafiltration in Dialysis - Does it preserve residual kidney function?					
 TRIAL QD		Onofriescu et al	COMPASS TRIAL	Souligny et al	BISTRO TRIAL
    	STUDY DESIGN & INCLUSION	RCT n = 131 UF removal BI guided Vs Clinical Judgement Follow up – 2.5 years	RCT n = 138 on PD Fluid management - BI guided Vs Clinical Judgement Follow up – 1 year	Meta-analysis and Systematic review 12 trials N=2406 (Both PD and HD)	RCT in HD patients UF removal- BI guided Vs Clinical Judgement N=437 Follow-up 2 years
	Mortality	Underpowered	No events	No reduction [RR]: 0.92; [CI]: 0.57–1.51	Not analyzed
	BP Control	Decrease in systolic BP in BI arm	↓ in diastolic BP in BI arm No difference in systolic BP	Decrease in systolic BP in BI arm	No difference in BP
	Residual Kidney function	Not analyzed	No difference in residual kidney function	Not analyzed	No difference in the rate of decline of residual kidney function
	Others	Decline in arterial stiffness and relative fluid overload in BI arm	No differences in echo parameters or arterial stiffness	No impact on other outcomes	No difference in time to anuria
Info by @sabarivenus  Dr Sabarinath S MD DM PDF FASN					

Dr. Vasanth G
Associate Professor of Nephrology,
PSG institute of Medical Sciences and Research
Coimbatore, Tamilnadu

All pain, No gain ? Do Hand grip exercises lead to Healthier Fistulas ?

Patients in the dialysis unit, religiously squeezing the stuffing out of a smiley ball is a familiar sight. But do these exercises actually work? A recently published [original research study](#) done in National Taiwan University Hospital looked at the evidence for benefit of isometric handgrip exercises (HGEs) post AVF construction.

Methods - The authors conducted parallel-group; 3-arm randomized controlled trial (ClinicalTrials.gov ID: NCT03077815). Sample size was 90 patients, calculated with an effect size of 0.5 and 80% power for 1:1:1 allocation into three treatment groups i.e., a basic HGE program (group A), an advanced program (group B), or an advanced- plus upper arm banding program (group C) and also accounted for 20% dropouts. The patients were required to squeeze and hold the ball for 5 seconds for each grip and repeat HGE over 5 minutes in each session (approximately 50 repeated handgrips). Group A patients had 2 daily HGE sessions, group B patients had 6 daily HGE sessions and group C patients had a standard upper arm tourniquet placed at the commencement of the 6 HGE sessions. All the assessors were blinded to the treatment allocation. The primary outcome was time to maturity of the AVF defined as an RC-AVF diameter >4.0 mm (average diameter of the body of the RC-AVF vein) and an RC-AVF flow >500 ml/min by sonography. The secondary endpoints were proportion of patients with RC-AVFs successfully used for the maintenance HD for at least 6 contiguous sessions, delivered the prescribed blood flow throughout, and achieved adequate hemodialysis.

Results - This study failed to demonstrate the clinical benefit of advancing frequency of postoperative HGE, with or without an upper arm tourniquet, for RC-AVF maturation over 3 months. There was no

statistically significant difference in any of the primary or secondary end points.

Limitations - 1. It's difficult to know whether the patients would have undertaken more HGEs than what was advised as these are simple exercises that can be easily done unsupervised and could potentially lead to treatment contamination between the groups. 2. The effect size of 0.5 between groups may have been overestimated as all are active treatment arms. 3. Seventy-seven patients were excluded for RC-AVF construction due to post-augmented cephalic vein diameter of <2.0 mm and radial artery with a post-flow mediated dilation internal diameter <2.0 mm which may have further reduced the actual effect size between treatment groups. 4. The decision for the clinical use of the RC-AVF was by the attending nephrologist blinded to the groupings and this may have led to discrepancy in assessment in a few patients compared to the more objective doppler measurements. 5. There was no measurement of the degree of isometric exercise in this study.

Strengths - 1. It is encouraging that even a negative study has been published as this will help researchers who are planning similar studies in future to recalculate the sample size and to rethink the rationale. 2. The sonography measurements were standardized across groups. 3. The researchers used a HGE regimen that was easily learned by patients, is pragmatic and more generalizable.

Dr. Suceena Alexander

Professor and Unit Head
Department of Nephrology
CMC, Vellore, India

Can the straight tip be coiled ? An Inconclusive ta'i'le

The modern peritoneal dialysis (PD) catheter which is a double cuffed silicon rubber tube designed by Sir Henry Tenckhoff and Schechter in 1968, was preceded by the use of a catheter which had a tube-like design without good outcomes. Russell Palmer and Wayne Quinton who had successfully manufactured a silicon rubber shunt for hemodialysis, developed a [catheter](#), which is a prototype of currently used coiled catheters. The double cuffed swan neck straight tipped Tenckhoff PD catheter has become a 'gold standard' in our daily practice for initiating chronic PD. But its not

full proof and comes with its own technical difficulties and complications.

The modern day PD catheter has three parts: the intra-peritoneal segment, the intercuff segment or the tunnelled segment, and the free outer segment to which the transfer set is attached. The main differences in PD catheter design include the number of cuffs, the shape of subcutaneous tract (straight vs. swan neck), and the shape of intraperitoneal tract (straight vs. coiled).

The presumed advantages of a coiled tip over a straight tipped catheter are better separation of parietal

and visceral layers of the peritoneum, better flow, lesser inflow pain, lesser migration, lesser trauma, and lesser incidence of omental wrap. The ISPD [guidelines](#) currently do not recommend one type of catheter over the other.

To provide more evidence, [AM Abdul Rasheed](#) et al. from Malaysia have looked at the differences in clinical outcomes and mortality in straight versus coiled

catheters. The retrospective study involved 126 patients including 75 straight tip (47 cm), and 51 coiled tip (57.5 cm) catheters, and followed them for approximately 10 years. All catheters were inserted by a single interventional nephrologist by the peritoneoscopic method. More than 70% of the patients in both the groups were dialysis naïve at initiation of the PD. The main results of this study are summarized in Table 1.

Table 1 Comparison of straight and coiled catheters by AM Abdul Rasheed et al.

Outcome	Coiled tip catheter	Straight tip catheter	Statistical significance
Catheter malfunction	30 (40%)	15 (24%)	NS*
Leaks	10		
Migration	9	7	
Flow problems	6	3	
Omental wrap	3	5	
Pleuroperitoneal fistula	2		
Mean time to catheter malfunction (months)	3.6±11	3.2±8	NS
PD failure	13 (17.3%)	9 (17.6%)	NS
Catheter associated infection (episodes/year)	0.29	0.31	NS
Mortality	22 (29.3%)	14 (27.5%)	NS

*NS- Not significant, PD – Peritoneal dialysis

This study is inconclusive to decide if coiled tip catheters are better, and on the contrary it showed a greater incidence of more catheter related malfunctions in the coiled tip group. Will this outcome change with the type of insertion? Well, only time and more trials will be able to answer that.

Is there strong evidence to favour one over the other? Eight small controlled trials are again inconclusive. Two meta-analysis showed no differences in outcomes between the two. Table 2 summarizes the current evidence on straight tipped versus coiled tipped catheters.

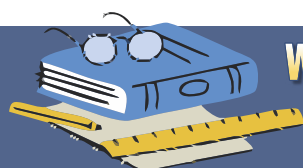
Unfortunately, we are still at an impasse when it comes to choosing straight tip versus coiled tip catheters in our patients for chronic PD. Infection related complications is the Achilles heel of PD failure in developing countries, and the contribution of catheter design to this needs more data. As Narayan Prasad has elegantly brought out in his [editorial](#), the need of the hour to settle this debate is a well planned RCT taking into account the insertion techniques, role of surgeons, infection related complications, mechanical complications and long term catheter survival. Until then, physician and center preferences and expertise will guide the choice of the PD catheter tip.

Table 2. Summary of studies on straight tip versus coiled tip PD catheters

Study authors	Number of patients	Conclusion
Akyol AM et al.	20 (coiled) and 20 (straight)	-No difference in mechanical complications -More ESI in straight tip group
Nielsen et al.	72 (straight), 72 (coiled) - randomized trial	Decreased catheter tip migration and survival in coiled tip
Xie et al.	40 (straight) and 40 (coiled)	More catheter tip migration in coiled tip group after 8 weeks
Chow et al.	151 (straight) and 155 (coiled)	Increased catheter malposition in the coiled tip group

ESI – exit site infections

Rajeevalochana Parthasarathy, Veenaa S Manjari



WISE VOICES

Quality Control In Dialysis Units

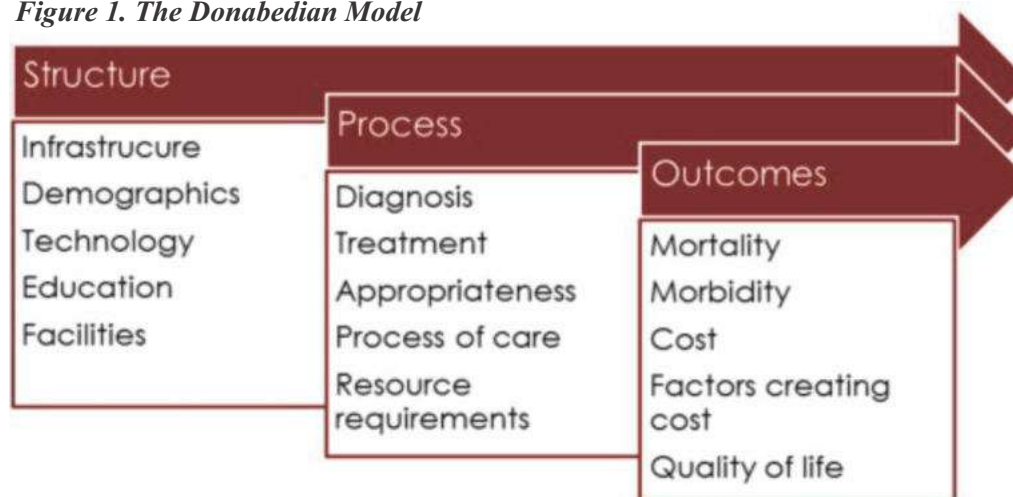
Introduction : A Global Burden of Disease study from 1990 to 2016 attributed the number of deaths attributable to CKD from 0.59 million to 1.18 million in India. A [2018 study](#) estimated 175000 patients are on chronic dialysis in India. As compared to the rest of the world, India's demand for dialysis is growing at a rate of [31 percent](#).

There are multiple challenges to meet this demand. Although the cost of dialysis in India is a small fraction of what it costs in the developed world, the limited purchasing power of the Indian population makes

living on maintainance haemodialysis a catastrophic expense. There is a gross mismatch between the dialysis facilities available and the need for dialysis, with very poor regulatory oversight leading to unsupervised dialysis quality.

So what is dialysis quality ? There are multiple definitions of the word quality. The International standard organization (ISO) defines quality as the degree to which a set of inherent characteristics fulfil the requirements.

Figure 1. The Donabedian Model



Ref - <https://www.sciencedirect.com/science/article/pii/S2352646715000368>

Table 1. Some Indicators Related to Structure, Process & Outcomes

INDICATORS RELATED TO STRUCTURE	INDICATORS RELATED TO PROCESS	INDICATORS RELATED TO OUTCOMES
Monitoring performance effectiveness	Hand hygiene compliance	Morbidity on dialysis
Machine breakdowns	Vascular bundle checklist compliance	No of patients with depression
Patient staff ratio	No of patients with Hb < 10 gm/dl	No of hospitalisations
		Mortality on dialysis

The requirement of a dialysis program is a service which leads to a longer survival with higher quality of life and minimum complications. Another related concept is accreditation. Accreditation is defined as the official approval given to an organisation when it meets certain standards. There are many accreditation bodies which act on behalf of the Govt of India like the Quality Council of India and National Accreditation Board for Hospitals. NABH does mainly accreditation of hospitals and laboratories and does not evaluate free standing dialysis facilities. Quality and Accreditation Institute on the other hand gives specific accreditation to free standing dialysis facilities and is recognised by the Govt of India.

The accreditation standards for a dialysis facility are described in 10 chapters and 94 standards which encompass various aspects of the care of patient in a dialysis facility. The standards relate to Governance, leadership, human resources, Safety, Facility management, Patient care, Pre-dialysis, dialysis and post dialysis care, water treatment, infection control, records, patient rights and education. Each standard is assessed by checking the evidences of compliance to certain predefined criteria. There are a total of 397 criteria. Criteria is evidence seeking proof of compliance. Criteria which reflect compliance to regulatory norms are given more weightage.

How should an organisation start its quality journey?

The quality management system implementation begins with defining the vision and mission of the organisation. **WITHOUT THE TOP MANAGEMENT'S COMMITMENT TO THIS QUALITY INITIATIVE,** this journey cannot be successful.

One of the first task to be completed is writing the documents like the manuals, procedures and formats to create an effective care delivery model and capture data to evaluate the program. An effective training program to convey these messages needs to be implemented consistently. The performance of the quality system needs to be inspected regularly by conducting internal audits. Audits lead to detection of variance from the standards and an opportunity to make necessary corrections. Later external accreditation bodies can be approached for audit and certification

So what is the reward: although the financial gain may not be substantial, the market appreciation subdued, the honest and consistent efforts in the quality journey reduces the variance in service delivery and may reduce the legal exposure.

Dr. Dhananjay Ookalkar,

Nephrologist

Dr. Ashwini Ookalkar

Clinical Quality Advisor

Bevel up or down- When you are confused and cannot conclude, follow your instincts

A well-functioning arterio-venous (AV) fistula is not only the Achilles heel but also the Cinderella of a hemodialysis patient. The preservation of patency of AV fistula is of utmost priority for the patient's survival. The direction of fistula needle during puncture has been a matter of some controversy till date since there is paucity of literature on fistula cannulation practices. The NKF KDOQI 2006 guidelines recommended needle placement (with back eye) at an angle of 25° with bevel up position during fistula puncture. However, the [KDOQI 2019 update](#) cited that rope ladder cannulation as the preferred method but the needle angle and direction of fistula puncture (bevel up or down) was not specified. This aspect of fistula cannulation varies widely between centres, depending upon the existing training practices.

Getting into the details-We have two types of fistula cannulation practices. The bevel up approach where needle bevel is oriented upward during fistula puncture and immediately rotated to bevel down position before starting extracorporeal blood flow is technically considered to provide less hemostasis and thus increase the compression time post dialysis needle removal. Also there are concerns of vascular access (VA) damage when 180° rotation of fistula needle is done after cannulating in bevel up orientation. However, the bevel up orientation gives a favorable cutting angle. On the other hand, some cannulators prefer to introduce the fistula needle in bevel down position as it is considered to provide better anatomical advantage and provide a natural closure of vessel flap under the effect of blood flow. Also, the bevel down needle introduction is assumed to be less painful and associated with reduced

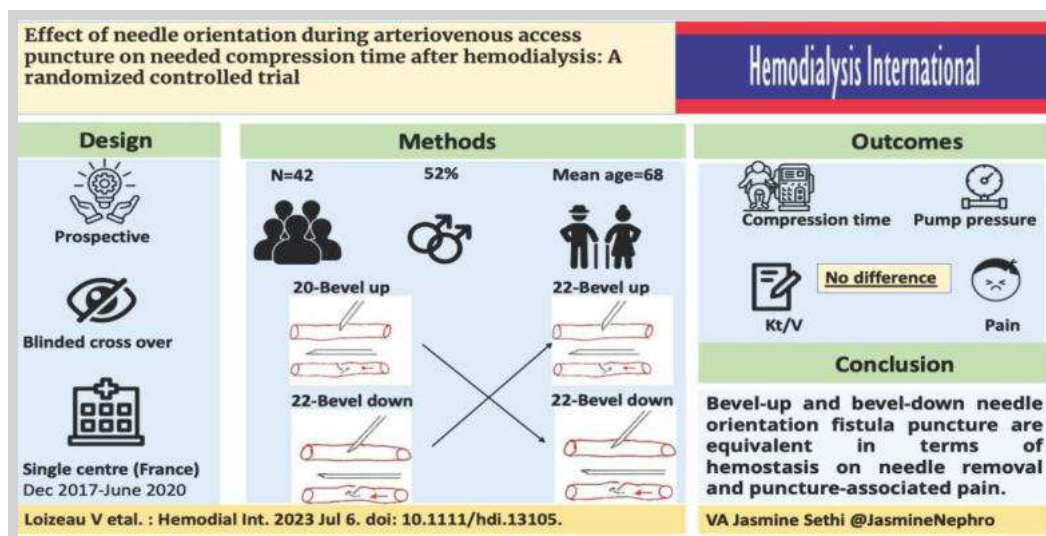
risk of transfixing the posterior wall of vascular access. A recent study by [Loizeau et al](#) recently published the results of a prospective, randomized, cross over study and showed no difference in puncture site pain and post dialysis compression time between the patients randomized to bevel up and bevel down needle orientation. There was also no effect on desired blood flow rate achieved and the pre-pump arterial or venous pressures. However, this study was not in agreement with the previous literature that has showed that bevel down needle orientation is associated with [reduced blood loss](#), [reduced compression times](#), [reduced puncture site pain](#) and [smaller skin incision](#) than bevel up orientation. The authors of the study admitted the limitation of being a single center study with its inherent potential selection bias concerning patients and nurses. Also, some more aspects remain unanswered, such as the optimum angle between the skin and the needle during insertion and optimum amount of compression pressure to apply after needle removal, the variations between which, may affect the outcomes reported in the present trial as well. Future large, multi-centre randomized trials are needed to assess these needle insertion conundrums, with reporting of fistula health in the short- and intermediate terms, in addition to patient-reported outcomes.

Dr Jasmine Sethi

Assistant Professor, Dept of Nephrology,
PGIMER, Chandigarh

Dr Vignesh Subramani

Senior Resident, Dept of Nephrology,
PGIMER, Chandigarh



Generic Drugs Should Be Prescribed By Doctors (Against the Motion)

A generic drug is a medication created to be the same as an already marketed brand-name drug in dosage form, safety, strength, route of administration, quality, performance characteristics, and intended use. Once the patent of the original research molecule expires, pharma companies are allowed to produce the drug and market it, provided they can prove bioequivalence. In a developing country like India where most patients must pay out of pocket, making treatment affordable using generic drugs makes perfect sense. However, there are two important issues that has made generics a bane instead of being a boon. First issue is not adhering to Current Good Manufacturing Practices (cGMP) and second issue is of poor drug regulation by the authorities.

cGMP lays down the various aspects of drug manufacturing which are to be followed by the pharma industry including the specifications for sterility, the hygiene of the premises, the functioning of the quality control and system of auditing. Testing for raw materials and all intermediate products through each step should occur with the HPLC machines linked to the main computer system. At any point, if quality test fails or impurities are detected, that entire batch is to be discarded. However, following cGMP makes the process arduous and results in increase in cost of production.

The generic Indian pharma industry is growing at a tremendous pace, earning the moniker of 'Pharmacy of the world'. The domestic market is estimated to be Rs 75000 crores and the export for years 2022-23 about 25 billion dollars. Unfortunately, there have been multiple scandals that have tarnished the image of the Indian generics. In late 2022, many Indian brands of cough syrup were found to result in the death of children in Gambia, Cameroon, and Uzbekistan. Investigations revealed the outbreak was due to using raw materials without appropriate testing. The cough syrups were contaminated with diethylene glycol resulting in kidney failure and deaths. The embarrassment was perfectly avoidable, if only the companies had followed cGMP. To make matters worse, there had been a similar outbreak in Jammu and Kashmir's Ramnagar in 2019-20, but alas, we had not learnt from our mistakes. Indian made eye drops have resulted in eye infections and blindness in US and Srilanka. These instances are only the tip of the iceberg, which come to light when the news is scandalous enough to catch the headlines. Studies involving conversion from innovator drug to generic

brands of Tacrolimus have documented erratic drug levels and episodes of rejection.

The Central Drugs Standards Control Organization (CDSCO), the equivalent of FDA in India, has been ineffective in monitoring the generic pharma industry. The drug inspectors follow a system of buying drugs from the open market and sending it to Government labs to check for purity. The drug inspectors are to follow due procedure, maintain proof of dispatch, apply "seals" to prevent tampering and ensure cold chain till samples reach the lab. If found, lacking in adequate quantity as advertised on label or containing impurities, the drug is recalled and the companies face prosecution. However, the lawyers representing the companies easily find a mistake and the case falls flat. Many Government labs don't have the facility to test complex drugs, hence the NSQ drugs declared by CDSCO commonly has antacids and antibiotics, but rarely, immunosuppressives or oncology drugs. Even if the lab finds the drug "Not of Standard Quality" (NSQ), the courts take a lenient view of the case and often award token punishments. As of now there is no punishment awarded in case of incomplete recall of a NSQ drug because there is no clear binding legislation on the issue. I am sure the Indian public deserve better.

The Indian pharma industry needs to assiduously follow cGMP and drug regulatory authorities needs to effectively monitor the huge generic pharma industry for India to indeed become the "Pharmacy of the world".



*Dr Anantharam Jairam, Professor, Nephrology,
St John's Medical College Hospital, Bengaluru*

Generic Drugs Should Be Prescribed By Doctors (For the Motion)

What is a generic drug ?

A generic drug is one that has outlived the original patent awarded to its innovator for the same molecule and can now be produced by any manufacturer subject to certain conditions. The generic drug has the same active ingredient as the innovator molecule, though its formulation, appearance, excipients etc could vary (with approved limits).

Generic drug vs original innovator molecule ?

The process of development and testing of a research molecule is a very convoluted and long drawn one, where only about 1 in 10,000 molecules make it to the final step of clinical testing. The final steps of animal studies, clinical trials and bioavailability for the original molecules are replaced with the concept of 'bioequivalence' for its generic cousin. These studies of bioequivalence are generally carried out in 20-30 healthy volunteers. This shortens the time period required for bringing the generic drug into the market without the associated cost of innovation, research and testing, hence reducing the overall cost. However, generic drugs face the same regulatory testing in the post marketing surveillance as the innovator molecule (at least in the developed nations).

Need for the development of generic drugs

Innovator drugs had begun to prove so expensive that public health schemes and medical insurance schemes across the United States and other western nations began to feel the burden. Today, more than 90% of all prescriptions written in the US are for generic drugs, but they account for only 18% of the overall health costs. Similarly, generics account for more than 70% of all prescriptions written in European nations, and account for nearly 30% of the health care costs. It is hence obvious that these drugs have achieved the basic aim for which they were developed.

The Indian Problem

It is ironic that India contributes to a major part of the generic drugs sold across the world and they have gained the trust of governments and the public in those countries. However, there is very little faith in these drugs, both among the patients and the doctors in India. What is even more ironic is that the standard to which these drugs are compared with in India are the branded generics of the western world, and not the innovator

molecule.

The NMC added fuel to the fire with its recent order that all doctors will only prescribe drugs by their generic name. The furor it created amongst the doctors of the country showed how little faith the doctors and lay public had in the efficacy and safety of commodity generics. It was a prudent decision on the part of the Govt to withdraw the order before matters became worse.

The way forward

However, there is light at the end of this tunnel. With the recent mishaps related to drugs produced in India across countries in the world, the Govt has begun to tighten the drug testing and reporting network. There is a laxity in the regulatory network of post marketing drug testing which is further compounded by the even more lax implementation of the existing punishments when a drug is found to be "Not of standard quality" (NSQ).

The recently passed Jan Vishwas Bill, which has replaced the Drugs and Cosmetics Act (1940), has further diluted the punishment for various misdemeanors and replaced imprisonment with just financial impositions. The Govt justifies this dilution by hoping that there has to be a better way to motivate manufacturers to comply with regulations than punitive sanctions and punishments.

This change of improved regulation and testing, coupled with better manufacturing practices is very likely to change the domestic opinion about commodity generics and will further reduce the cost of drugs in the country. It will also propel India to truly become the "Pharmacy to the world."

Worldwide penetration of generics in drug market



Dr Ranjith Nair, MD,DNB,DM, Professor, Nephrology,
(Presently Brig (HR), O/o DGAFMS,
Ministry of Defence, New Delhi)



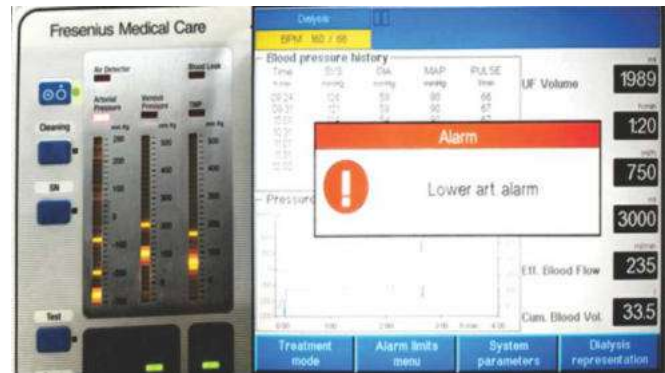
ALARMS IN HEMODIALYSIS MACHINE

Sandeep Mahajan, Vineet Behera

Question 1.

40 year old male is on thrice weekly hemodialysis for 9 months through tunnelled catheter in right internal jugular vein. Over the last 4 sessions, he has multiple episodes of arterial pressure alarms showing -300 to -350 mm Hg. The technicians manage it by reducing the speed of blood pump and changing his neck position/ pulling the catheter, which improves the flow for some time, but it recurs again. A possibility of catheter lumen thrombus was considered, and intra luminal administration of alteplase was done. But still, he has arterial alarm. How should this case be managed?

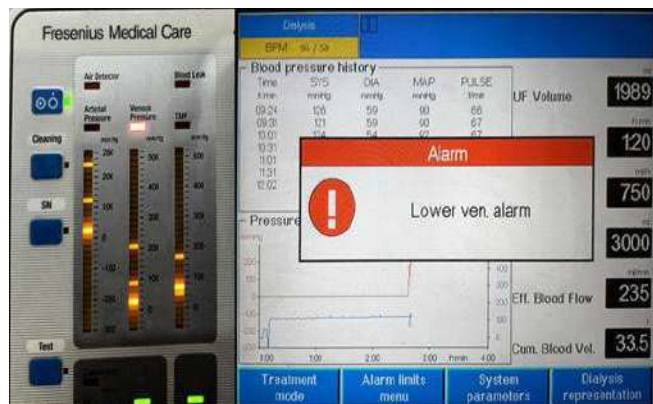
- Reverse the arterial and venous ports and continue HD, ignoring the alarm.
- Remove this TCC and insert TCC in Left IJV.
- Do a diagnostic venogram of central veins and evaluate
- Repeat thrombolysis using alteplase.



Question 2.

55 year old female is on twice weekly hemodialysis from a peripheral centre since 8 months. Her recently created right BC AVF was used for access since last 3 sessions. She skipped dialysis and all medications for a week. She developed acute onset dyspnea with restlessness and was found to have hypertensive emergency (BP 220/140mmHg), hypoxemia and pulmonary edema. She was urgently initiated on dialysis with target ultrafiltrate (UF) of 3L. After 1 hour, with an UF 1L removed, she became better with BP 170/100 and SpO2 93% on oxygen. There was intermittent venous pressure alarm with pressure 200-250mm Hg, which the technicians ignored. After 10min, there was again venous pressure alarm with pressure 10mm Hg, and patient developed hypotension (BP 80/60 mm Hg). It was managed with stopping of UF, head low position, and treating hypotension with albumin and fluid bolus. What is the likely cause of this alarm and how to manage?

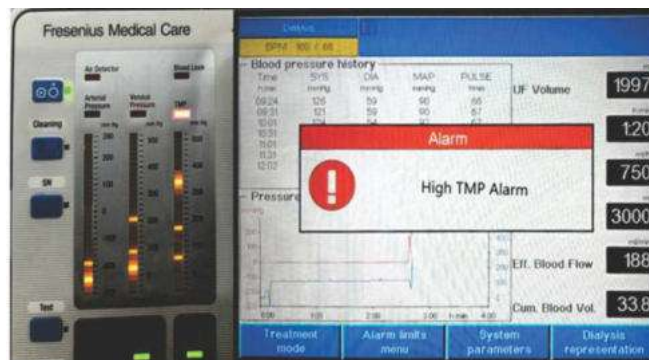
- Likely due to high UF removed. Continue dialysis after BP improves with no UF.
- Likely due to venous line dislodgement. Stop dialysis and assess venous line AVF.
- Likely due to central vein thrombosis. Continue dialysis after BP improves. Do diagnostic venogram to evaluate for thrombosis
- None of the above.



Question 3.

29 year old male is on thrice weekly hemodialysis for 2 months through right IJV TCC at a charitable centre which reuse each dialyser for 6-8 times. He underwent successful AVF creation and was on saline dialysis for last 2 episodes. After 3 hours of dialysis, he developed intermittent TMP pressure alarm with TMP between 350- 400 mmHg. The technician checked for any clamps, flushed the blood line with 200ml saline, increased the blood flow rate and continued dialysis. The patient subsequently developed high venous pressure alarm with presence of clots in the venous line and chambers. The dialysis was stopped. What is the likely cause of TMP alarm

- a. TCC dysfunction like intraluminal thrombus, fibrin sheath, central vein stenosis.
- b. Clots in the venous line only, due non use of heparin in saline dialysis.
- c. Problem with dialysate due to low or high conductivity
- d. Dialyser dysfunction due to filter clotting due to multiple reuse.

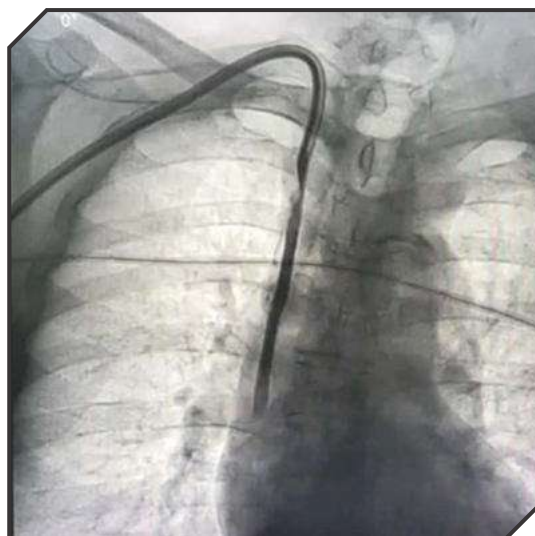


Answers

1. Option c. Do a diagnostic venogram of central veins and evaluate

The normal arterial pressures are -150 to -250 mm Hg. The causes of low arterial pressure alarm include reversible causes like kink or clot in arterial line, hypotensive patient, increase in intra thoracic pressure, which may be managed accordingly. In case of AVF, it may occur due to improperly positioned or small arterial needle, arterial spasm or indicate a stenosis/thrombus of arterial segment. Low arterial pressure in a catheter include thrombus within catheter or in central veins, central vein stenosis, fibrin sheath, or any other obstruction in pathway.

This patient underwent a diagnostic catheter venogram and was found to have a fibrin sheath. Thereafter, fibrin sheath balloon disruption was done and new TCC inserted through same site. The arterial pressure normalised in subsequent dialysis.





2. Option b. Likely due to venous line dislodgement. Stop dialysis and assess venous line AVF.

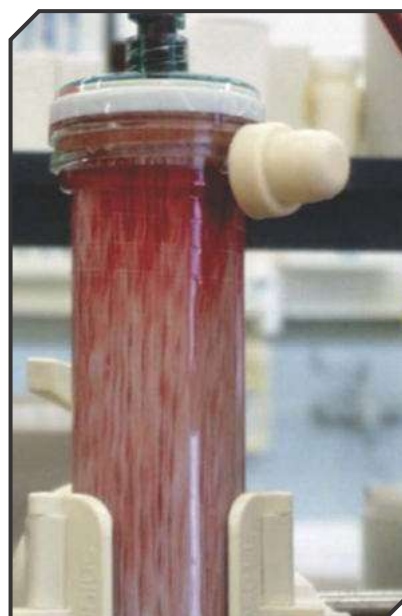
The normal venous pressures are 100-150 mm Hg. The causes of high venous pressure alarm include reversible or temporary causes include any kink or clot in venous line, needle clot or use of thin needle, thrombus or stenosis in venous arm of AVF or central vein stenosis. Low venous pressure alarm may occur in line disconnection or dislodgement, use of post pump clamp. In this case, it was a new AVF with relatively thin vessel walls, and the patient was restless. Due to frequent hand movements, he developed a hematoma at needle insertion site, which caused intermittent high pressure. Thereafter, there was complete dislodgement of venous line, causing sudden drop in venous pressure, blood loss and hypotension.

This is an emergency and needs emergency control of bleeding by compression, stopping dialysis, correcting hemodynamics, assessing blood loss for need of transfusion. In case the patient still needs urgent dialysis, it may be done through a new site of venous needle insertion, but only after stabilizing the patient.

3. Option d. Dialyser dysfunction due to frequent reuse of dialyser.

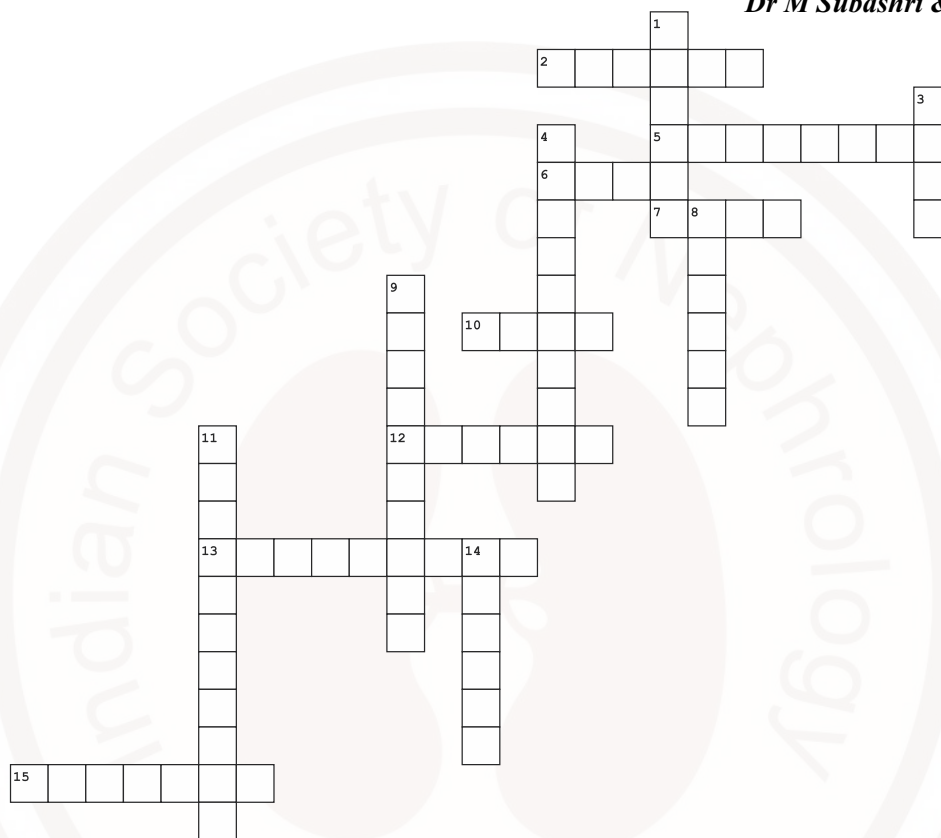
TMP (Trans membrane pressure) is the pressure difference between blood and fluid component in the dialyser. The normal TMP are 50-150 mm Hg. The causes of sudden rise in TMP include any kink or clamp in the line from the pressure gauge to the filter, embolus of clot in dialyzer and filter clotting. Filter clotting may be predisposed by inadequate anticoagulation, low blood flow, poor priming, high hematocrit, high ultrafiltrate rate, or concurrent infusion of fluids like TPN. Multiple reuse may deteriorate the structure of dialyser membrane making them more susceptible to clotting.

In this case, the dialyser was more prone to clotting due to multiple reuse and saline dialysis. It initially developed small clots in the dialyser (causing high TMP) which when untreated caused clots in the venous line and chambers leading to high venous pressure alarm.



Dialysis Dilemmas

By Dr Sandhya Suresh,
Dr M Subashri & Dr Pallavi Prasad



SOLVE THE PUZZLE HERE

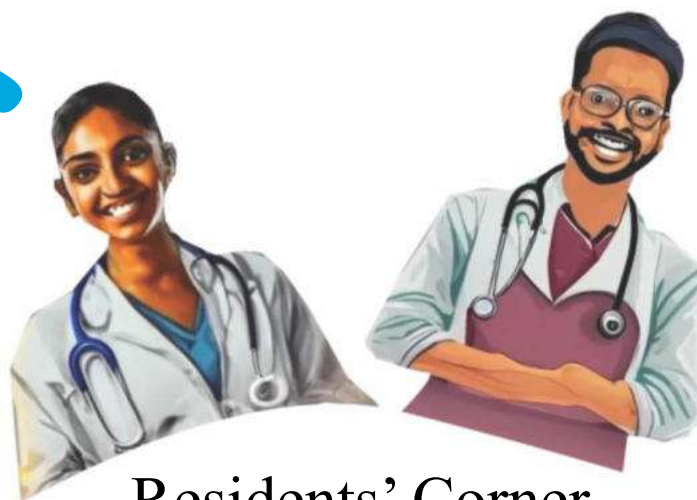
Across

- 2) Requiem in D Minor is a famous composition by which composer who is thought by few to have died of kidney failure
- 5) Part of the RO plant that is used to remove calcium and magnesium for sodium that is affixed to resin bed
- 6) The recipient of the 2003 Nobel Prize in Chemistry for his discovery of the aquaporin water channels
- 7) The mechanistic analysis of this study on dialysis adequacy by Gotch and Sargent helped to define Kt/V
- 10) Guidelines for standards in dialysis water quality are given by this body
- 12) An international collaboration among recognized experts from nephrology, clinical toxicology and various fields to provide guidelines on utility of extracorporeal therapies in poisoning
- 13) Equation used to convert urea reduction rate to Kt/V
- 15) This anticoagulant was discovered paradoxically in an attempt to isolate a thromboplastic agent

Down

- 1) The name of dialysate connection port which is also an old name of leprosy
- 3) Surgical procedure done in AVF steal syndrome which treats ischemia simultaneously preserving fistula patency
- 4) The antibiotic isolated from Streptomyces orientalis, informally known as “mississippi mud”
- 8) A geographic portmanteau, this study evaluated the effect of adequacy of peritoneal dialysis
- 9) Hyperosmolar hyponatremia may result from the use of this PD solution due to retention of its metabolites
- 11) Nicolandani Branham sign refers to — and hypertension on occlusion of arterial supply to an AVF
- 14) Bedside test done in patients before planning a forearm AVF

Answers to the Crossword are available on page 28



Residents' Corner

A Case of Acute Kidney Injury Due to Fish Bile Ingestion

Consumption of fish's gall bladder as a food item is common amongst the non-vegetarian people of West Bengal. Many people of this region believe that fish's bile of grass carp variety (*Ctenopharyngodon idellus*) as food helps in improvement of vision and decreases the blood sugar level. Chinese people believe that fish's gall bladder cures fever and asthma. However, at times this may cause toxic hepatitis and acute renal failure. Poisoning due to ingestion of fish gall bladder was first reported from China. A syndrome of AKI and acute hepatitis was also reported from Hong Kong, Japan, India and United States. Acute Kidney Injury occurs in 50-100% of all fish gall bladder poisoning. Due to its clinical significance, we are reporting one such case here.

56 year old male, farmer by occupation, who was a known case of hypertension and Type 2 DM from 5 years, presented with history of ingestion of fish bile 1 week prior to admission. Subsequently, patient became anuric after 12 hours. Patient developed yellowish discolouration of eyes and skin, altered sensorium. Underwent 3 sessions of hemodialysis before being admitted at our institute. There was no h/o bleeding from any site, hematuria, fever, abnormal body movements, intake of alternative medicines, chest pain, rash, cough or palpitations.

On examination, patient was conscious but disoriented with b/l flapping tremors of hand. Pulse-

80/min, BP-126/84 mm Hg and respiratory rate was 20/min. There was no pallor, edema, cyanosis or clubbing. Icterus was positive.

On systemic examination no other significant findings were noted. At presentation his urea was 121, creatinine was 8.1 and total bilirubin was 7.4 (direct 4.6) with SGPT 146.

Patient managed for hepatic encephalopathy and AKI and alternate day dialysis initiated. Patient was given steroids keeping a possibility of Acute Interstitial Nephritis (AIN) also. Renal biopsy was done subsequently that was s/o acute tubular injury, AIN and diabetic nephropathy class IIA. It has been seen in various studies and cases that initiation of steroids early in the course of AIN not only hastens the recovery but also decreases the chances of development of interstitial fibrosis. In [most](#) of the [cases](#) of AKI due to fish bile poisoning, steroids were not used; but we used steroids in view of AIN. As per our expectations, the urine output gradually improved and LFT normalized.

With HD and steroids patient continued improving. His urine output was again back to normal and creatinine was coming towards the baseline. HD was planned to be spaced out in subsequent hospital stay.

On 20th day of hospital stay his creatinine was 2.25 and total bilirubin was 1.6 with liver enzymes coming down to normal levels.

Patient was discharged subsequently off HD

Resident doctors image created with the assistance of AI from Craiyon.com

with steroids, insulin and oral hypoglycemic and other medications and was asked to follow up in outpatient department of Nephrology, SSKMH. After 1 week his creatinine came to 1.6 with LFT also returning back to normal and urine output continued to be normal. His steroid tapering was started and was stopped in 1 month.

Dr. Muzzamil Ahmed

&

Dr. Gopambuj Singh Rathod

P.D.T Nephrology, I.P.G.M.E.R

& S.S.K.M.H. Kolkata, W.B.

THE NITTY GRITTY OF VASCULAR ACCESS FAILURE.

- An unusual complication.

Vascular access is an anchor to offer effective haemodialysis, due to its influence on morbidity and mortality of the cases. Haemodialysis requires steady, recurrent access to the circulation. Clinical practice has directed the emergence of 2 distinct classes of catheter access: a) Temporary catheter and b) tunnelled cuffed catheter. Numerous complications occur related to access but still, the salvage of access must be tried. Here we present one such case with a torrid vascular access history, in whom the placement of a tunnelled catheter met with an uncommon complication. A 70-year-old female, average built, DM, HTN, Old treated Pulmonary Koch's, CKD, presumed Diabetic Kidney disease, was on medical management for 3 years, with urine output of 5- 10 ml (anuric), progressed to CKD 5.

The patient who had a history of multiple vascular access failures was referred to a tertiary care centre for treatment and renal replacement therapy form selection. Prior to presentation the patient had had a right double lumen internal jugular vein temporary catheter which was used for dialysis for 6 weeks post which she developed a right internal jugular vein thrombus. Left radiocephalic AVF, Right radiocephalic AVF, and Left Brachiocephalic AVF all experienced primary failure, following which the patient was given an option for peritoneal dialysis and was initiated on it but due to recurrent peritonitis, it was discontinued after a year.

After this, the patient presented for a tunnelled cuffed catheter insertion. The procedure involved a left-tunnelled catheter insertion due to the lack of suitable sites for HD access. During the procedure, a 0.035 hydrophilic Terumo guidewire was used to enter the subclavian vein, right atrium, and inferior vena cava. Serial track dilatation was performed on the Terumo guidewire, and arterial backflow was obtained during the placement of the sheath. Contrast injection revealed it to be in the right innominate artery. Arterial access was obtained through the Right common femoral artery associated pigtail aortogram for assessing the nature of arterial injury and there it was found to have soft tissue track between the right innominate artery and the left

innominate vein. The sheath was pulled back over the guide wire and renegotiated into the innominate vein, subclavian vein, right atrium, and inferior vena cava. A tunnelled cuffed catheter was placed, and a check aortogram showed a persisting fistula between the innominate artery and the innominate vein.

Arterial injuries occurs in less than 1% of catheter placements, while arterial puncture occurs in 4.2-9.3% of line placements and is often easily recognised secondary to pulsatile flow, but recognition may be difficult in a hypotensive and critically ill patient. Fluoroscopy or ultrasound does not eliminate the risk of arterial puncture, and catheters can still be inadvertently placed into the arterial system. In this instance, leaving the catheter in place and immediate removal with pressure, each carries separate risks. Immediate removal can lead to uncontrolled haemorrhage, pseudoaneurysm, and arteriovenous fistula formation, especially in patients treated with anticoagulants or antiplatelet agents. Leaving the arterial catheter in place and prompt repair carries less morbidity and mortality than catheter removal with pressure. AV fistulas can be treated with image guide coiling, pseudoaneurysms, or image-guided thrombin or coil placement, but prosthetic material in the venous system is highly thrombogenic. The primary goal should be to save the patient's life.



Dr Urvashi Khan, Dr Yasir Rizvi, Dr L.K. Jha

Nephrology and Intervention Radiology Department,
Dharamshila Narayana Superspeciality Hospital, New Delhi

ISN CROSSWORD ANSWERS

ACROSS

- 2) MOZART - His death was attributed to several causes, one among which is kidney failure as detailed in this [JASN review](#)
- 5) SOFTENER: [Water softeners](#) exchange calcium and magnesium for sodium that has been affixed to a resin bed. Although these ions are also removed by RO, water softeners in regions with 'hard water' reduce accumulation of calcium and magnesium salts, thereby prolonging the life of the RO membrane.
- 6) AGRE : Peter C Agre was the recipient of the [2003 Nobel Prize in Chemistry](#) for his discovery of the aquaporin water channels. The function of many cells requires that water move rapidly into and out of them. There was only indirect evidence that proteinaceous channels provide this vital activity until Agre and colleagues purified aquaporin-1 from human erythrocytes and reported its cDNA sequence
- 7) NCDS - The level of dialysis prescribed in the [National Cooperative Dialysis Study](#) was mechanistically defined as Kt/V (product of dialyzer urea clearance and treatment time divided by body urea volume), which exponentially determines decrease in BUN during dialysis
- 10) AAMI - The AAMI guidelines gives microbiological and chemical standards for dialysis [water quality](#). The microbiological requirements include <100 colony forming units/ml and <0.25 endotoxin units/ml.
- 12) EXTRIP: Extracorporeal treatments (ECTRs), such as hemodialysis and hemoperfusion, are used in poisoning despite a lack of controlled human trials demonstrating efficacy. To provide uniform recommendations, the [EXTRIP](#) group was formed as an international collaboration among recognized experts from nephrology, clinical toxicology, critical care, or pharmacology and supported by over 30 professional societies.
- 13) DAUGIRDAS- This [equation](#) estimates Kt/V using predialysis to postdialysis urea nitrogen ratio (R), ultrafiltration, dialysis session length in hours (t), and anthropometric or modeled volume (V).
- 15) HEPARIN: Heparin is the oldest anticoagulant used in clinical medicine. Paradoxically, heparin was [discovered by Mclean](#) in 1916 in an attempt to isolate a thromboplastic agent. Heparin is a naturally occurring polysaccharide belonging to the family of glycosaminoglycans ubiquitously present in mast cells. This anticoagulant was discovered paradoxically in an attempt to isolate a thromboplastic agent

DOWN

- 1) HANSEN - female Hansen Connectors, also known as dialyzer port quick disconnects, are meant for connecting a dialysate port of a dialyzer to a dialysate-delivery line of a dialysis machine
- 3) DRIL- Distal revascularisation and interval ligation [procedure](#) involves placing a bypass graft few cm proximal to the arterial anastomotic site and extending distal to the anastomotic site. The native artery is ligated just distal to the access but proximal to the distal bypass graft anastomosis.
- 4) VANCOMYCIN : Vancomycin was [isolated in 1956](#) from the products of the functional activity of actinomycetes *Streptomyces orientalis* currently *Nocardia orientalis*, was known as "mississippi mud" due to its brown color before purification
- 8) CANUSA - This prospective cohort [study](#) done in Canada and USA evaluated the relationship of adequacy of peritoneal dialysis and nutritional status to mortality, technique failure, and morbidity
- 9) ICODextrin - The osmotically active molecules of icodextrin metabolites (e.g., maltose, maltotriose, other glucose multimers) may lead to [hyponatremia in peritoneal dialysis patients](#) via a dilutional effect
- 11) BRADYCARDIA- There is a decrease in pulse and increase in blood pressure associated with decreased cardiac output that immediately follows the sudden occlusion of an arteriovenous (A-V) fistula, also called as [Nicolandani Branham](#) sign. It can be used to detect high output AVF at bedside while performing Echo
- 14) ALLEN'S - The Allen test is a bedside method that is used in hemodialysis access surgery for [determining risk of postoperative hand ischemia](#). Test is termed positive when hand palm pallor persists following release of a clamped radial artery while the ulnar artery is still compressed (or vice versa).



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Images on Photo Frames -

- Bulb Dialyzer (Thomas Graham) : https://doi.org/10.1142/9789814289764_0003
- Vividiffusion Apparatus (Abel & Colleagues) : <http://dx.doi.org/10.1111/j.1542-4758.2008.00253.x>
- Rotating Drum Dialyzer (Kolff) : <http://dx.doi.org/10.1111/j.1542-4758.2008.00253.x>
- Kiil Dialyzer : <http://dx.doi.org/10.1111/j.1542-4758.2008.00253.x>
- First Hollow Fibre Dialyzer : <https://doi.org/10.1177/039139880703001103>
- First CRRT : <https://doi.org/10.5301%2Fijao.5000610>

Not all **HIF-PHIs** are the same!

SOME ARE A CLASS APART

Amongst HIF-PHIs,
Desidustat has **minimal**
potential to cause
drug-drug interactions¹

Better Hb response vs. EPO
in dialysis-dependent CKD
patients²



HIF-PHIs: Hypoxia-inducible factor-prolyl hydroxylase domain inhibitors. **Hb:** Hemoglobin. **CKD:** Chronic kidney disease. **ESAs:** Erythropoietin stimulating agents. **EPO:** Erythropoietin.

References: 1. Dhillion S. Desidustat: First Approval. *Drugs*. 2022;82(11):1207-1212. 2. Chen D, Niu Y, Liu F, et al. Safety of HIF Prolyl-Hydroxylase Inhibitors for Anemia in Dialysis Patients: A Systematic Review and Network Meta-Analysis. *Front Pharmacol*. 2023;14:1163908.

ABBREVIATED PRESCRIBING INFORMATION: **Composition:** Each uncoated tablet contains Desidustat 25 mg, 50 mg or 100 mg. **Indication:** Treatment of Anemia in Adult Patients with Chronic Kidney Disease (CKD) not on Dialysis and on Dialysis. **Dosage and administration:** For non dialysis patients, The starting dose of Desidustat is 100 mg (1 tablet of 100 mg, OR 2 Tablets of 50 mg OR 4 tablets of 25 mg) orally thrice in a week. For dialysis patients, The Starting dose of Desidustat is 100 mg (1 tablet of 100 mg, OR 2 Tablets of 50 mg OR 4 tablets of 25 mg) or 125 mg (1 tablet of 100 mg and 1 tablet of 25 mg OR 2 Tablets of 50 mg and 1 tablet of 25 mg OR 5 tablets of 25 mg) or 150 mg (1 tablet of 100 mg and 1 tablet of 50 mg, 1 tablet of 100 mg and 2 tablets of 25 mg OR 3 Tablets of 50 mg OR 6 tablets of 25 mg) thrice in a week. It is recommended that Desidustat is to be taken after the completion of the dialysis session. **Contraindications:** Hypersensitivity to Desidustat or any of the excipients used in the formulation. **Special warnings and precautions for use:** No drug-related severe or serious adverse event or any life-threatening condition which requires special attention observed during the study. **Drug interactions:** The in vitro assays did not reveal any significant inhibition of major drug-metabolizing enzymes. **Pregnancy Category:** C. Nursing mothers should not use Desidustat because it is not known whether Desidustat is excreted into the breast milk. Safety and efficacy of Desidustat in pediatric patients have not been established. Desidustat should be used with caution in geriatric patients. **Adverse events:** Most common AEs (>2%) reported from phase III includes Gastrointestinal symptoms including nausea, vomiting and abdominal pain, Headache, UTIs, Pyrexia and Peripheral edema. **Overdose:** No incidence of overdose with Desidustat has been reported. In case of overdose with Desidustat, general supportive care of the patient is indicated, including monitoring of vital signs and observation of clinical status. **Storage and handling instructions:** Store below 30°C. Keep out of reach of children. **Shelf life:** 24 months. FOR FULL INFORMATION, PLEASE REFER TO THE FULL PRESCRIBING INFORMATION

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