Simultaneous Combined heart and kidney transplant – A rare feat in the journey of dual organ transplant

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- 58-year-old male with post renal transplant status presented with repeated complaints of

➢ Breathlessness- NYHA Grade III-IV

➢ Pedal edema

Despite on hemodialysis and best possible medical treatment for the heart failure

BACKGROUND

- Case of end-stage heart and kidney disease.

CKD

- MPGN CKD stage 5D
- Dialysis altenate day

Transplant

- Live renal transplant in 2001

Cardiac History

.

CAD

First episode in october 2022

On medical management- Dual antiplatelet+statin

CAD

Second event in August 2024

CAG->TVD

Echo->Gobal hypokinesia

EF 20%

Moderate PAH

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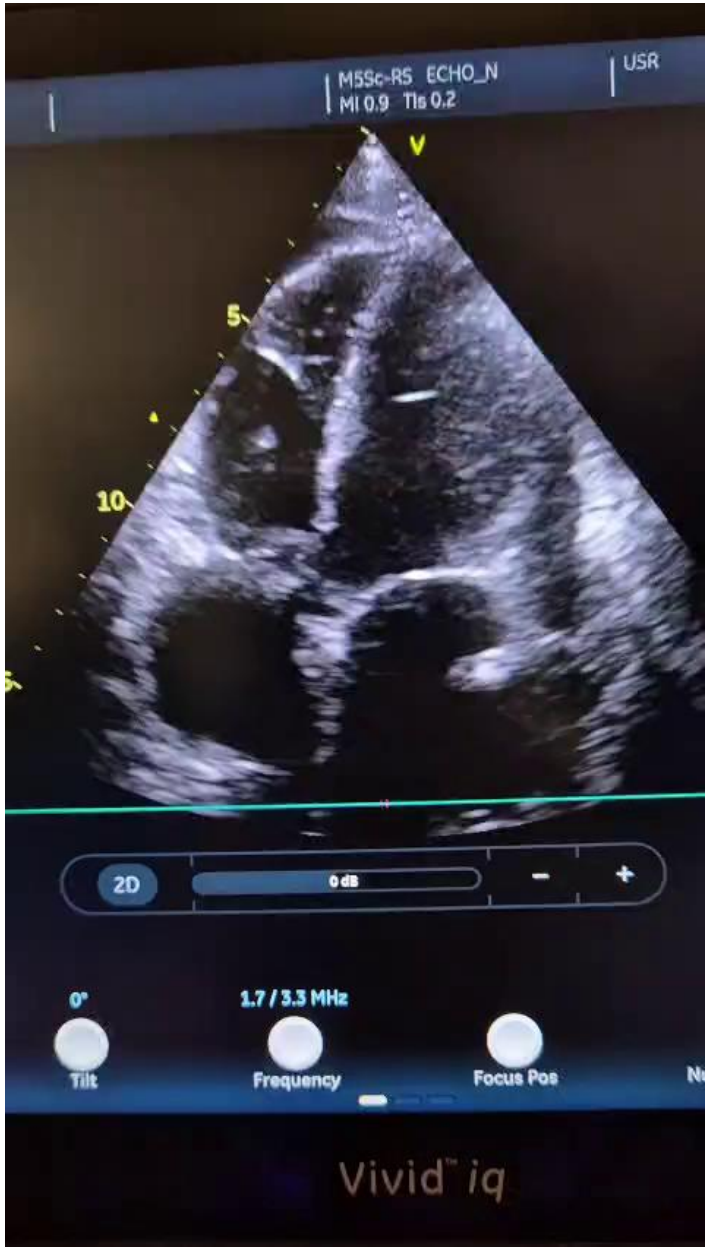
Transthoracic Echocardiogram



In September 2024

Decrease urine output
Increased reneal function Test
Metaboic acidosis

Allograft Nephropathy with graft failure

CKD stage 5D

Hemodialysis thrice weekly

Diagnosis

Ischemic Cardiomypathy

Post renal transplant graft failure

What Next?

- CABG+Kidney transplant
- Kidney transplant
- Heart transplant
- Combined Heart+Kidney transplant

Need for Dual organ- Pros & Cons

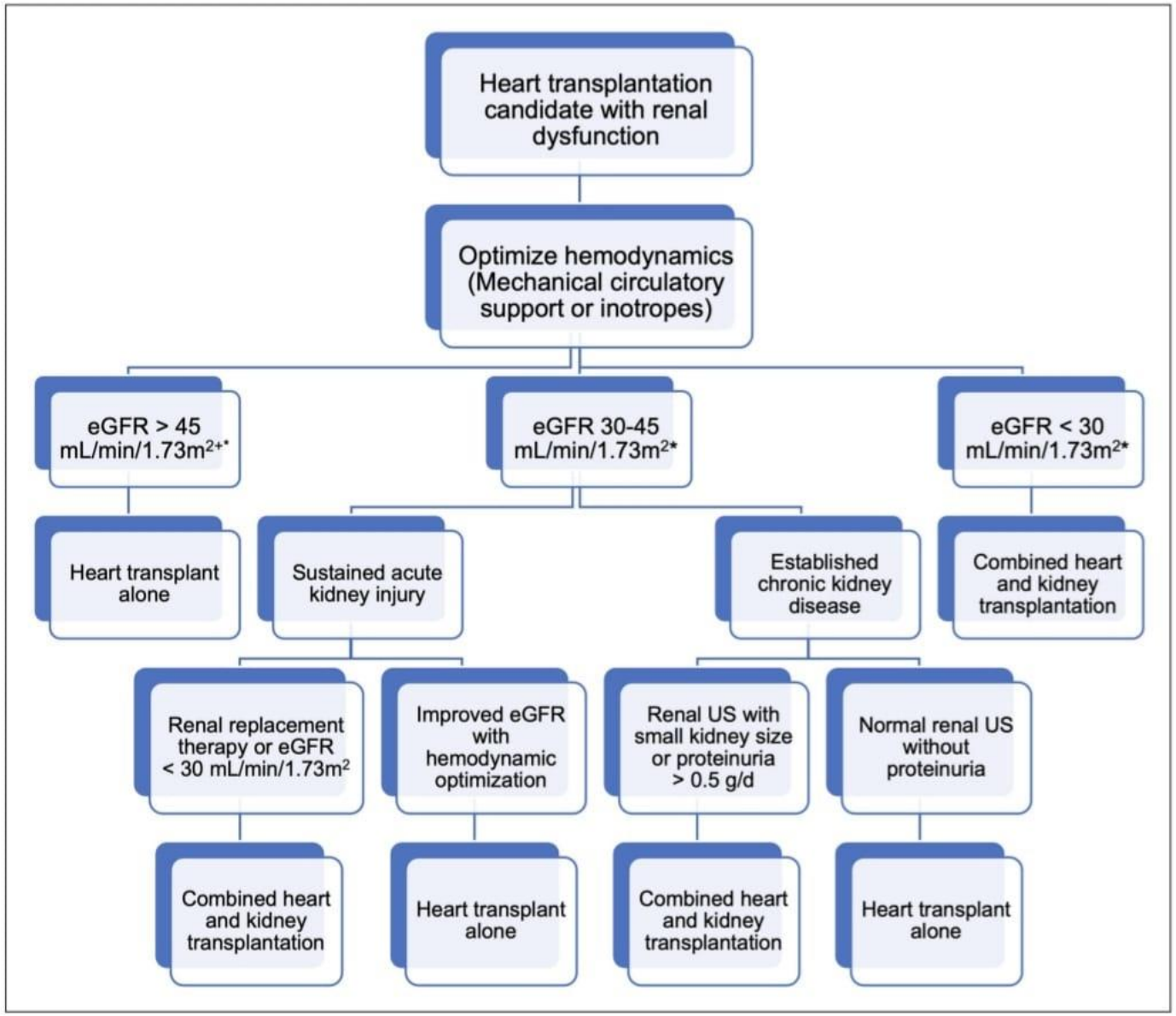
- eGFR <30ml/min /BSA relative contraindication to HTx

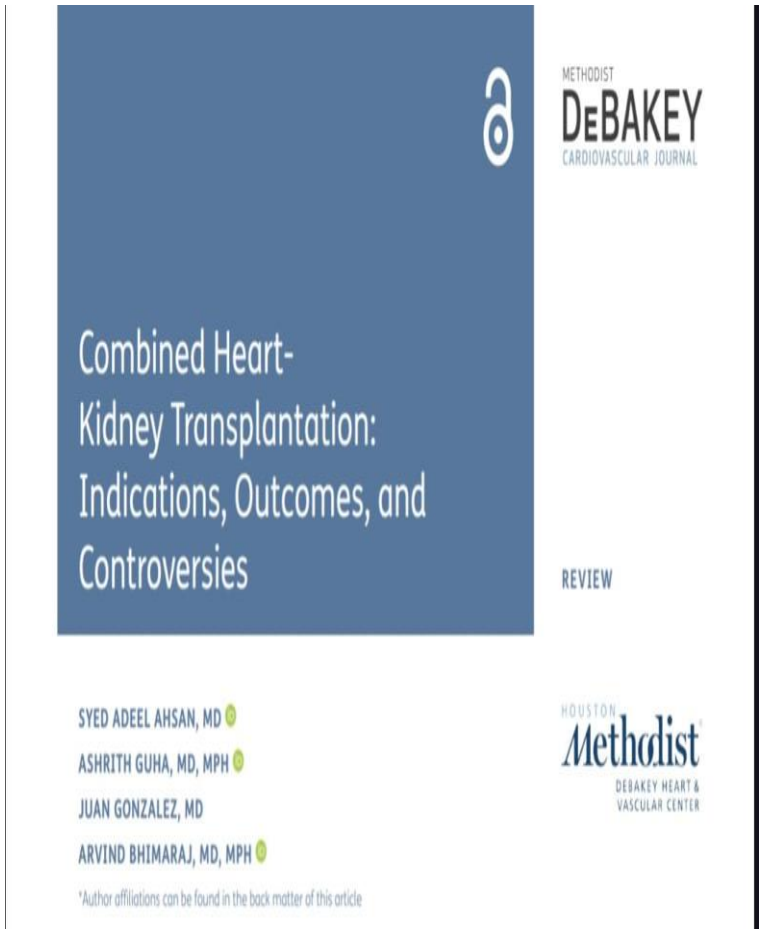
Practice Guideline › J Heart Lung Transplant. 2016 Jan;35(1):1-23.
doi: 10.1016/j.healun.2015.10.023.

The 2016 International Society for Heart Lung Transplantation listing criteria for heart transplantation: A 10-year update

Mandeep R Mehra, Charles E Canter, Margaret M Hannan, Marc J Semigran, Patricia A Uber, David A Baran, Lara Danziger-Isakov, James K Kirklin, Richard Kirk, Sudhir S Kushwaha, Lars H Lund, Luciano Potena, Heather J Ross, David O Taylor, Erik A M Verschuuren, Andreas Zuckermann; International Society for Heart Lung Transplantation (ISHLT) Infectious Diseases, Pediatric and Heart Failure and Transplantation Councils

PMID: 26776864 DOI: 10.1016/j.healun.2015.10.023


Heart transplantation candidate with renal dysfunction
Optimize hemodynamics (Mechanical circulatory support or inotropes)
eGFR > 45 mL/min/1.73m2+*
eGFR 30-45 mL/min/1.73m2*
eGFR < 30 mL/min/1.73m2*
Heart transplant alone
Sustained acute kidney injury
Established chronic kidney disease
Combined heart and kidney transplantation
Renal replacement therapy or eGFR < 30 mL/min/1.73m2
Improved eGFR with hemodynamic optimization
Renal US with small kidney size or proteinuria > 0.5 g/d
Normal renal US without proteinuria
Combined heart and kidney transplantation
Heart transplant alone
Combined heart and kidney transplantation
Heart transplant alone


METHODIST
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CARDIOVASCULAR JOURNAL
Combined Heart-Kidney Transplantation: Indications, Outcomes, and Controversies
REVIEW
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Cardiac outcomes in HKTx Vs HTx

- 1yr survival is similar, 5& 10yr cardiac graft survival significantly better in HKTx compared with HTx.
- Lower rates of cardiac allograft rejection in HKTx comapred with HTx

Agarwal KA, Patel H, Agrawal N, Cardarelli F, Goyal N. Cardiac Outcomes in Isolated Heart and Simultaneous Kidney and Heart Transplants in the United States. Kidney Int Rep. 2021 Jul 14;6(9):2348-2357. doi: 10.1016/j.ekir.2021.06.032

Raichlin E, Kushwaha SS, Daly RC, et al. Combined heart and kidney transplantation provides an excellent survival and decreases risk of cardiac cellular rejection and coronary allograft vasculopathy. Transplant Proc. 2011 Jun;43(5):1871-6. doi: 10.1016/j.transproceed.2011.01.190

Renal outcomes in HKTx vs HTx

- HKTx associated with improved renal survival outcomes compared with HTx in patients with imapaired renal function.

- Reduced eGFR prior to HTx associated with increase ESRD and need for dialysis.

Grupper A, Grupper A, Daly RC, et al. Renal Allograft Outcome After Simultaneous Heart and Kidney Transplantation. Am J Cardiol. 2017 Aug 1;120(3):494-499. doi: 10.1016/j.amjcard.2017.05.006

Simultaneous heart and kidney transplantation: a systematic review and proportional meta-analysis of its characteristics and long-term variables.

691 records screened > 33 full-text articles assessed > 15 studies included in the qualitative/quantitative analysis

Demographics

376 Patients (total)

84% Males

71% Dialysis-dependent

Transplant indication

47% Ischemic cardiomyopathy

22% Cardiorenal syndrome

Main findings

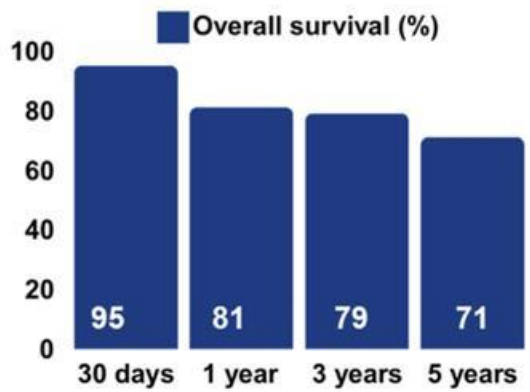
67.49 months Mean Follow-up

13% rejection

17% rejection

16% in-hospital mortality

Delayed kidney graft function in 33% of the patients

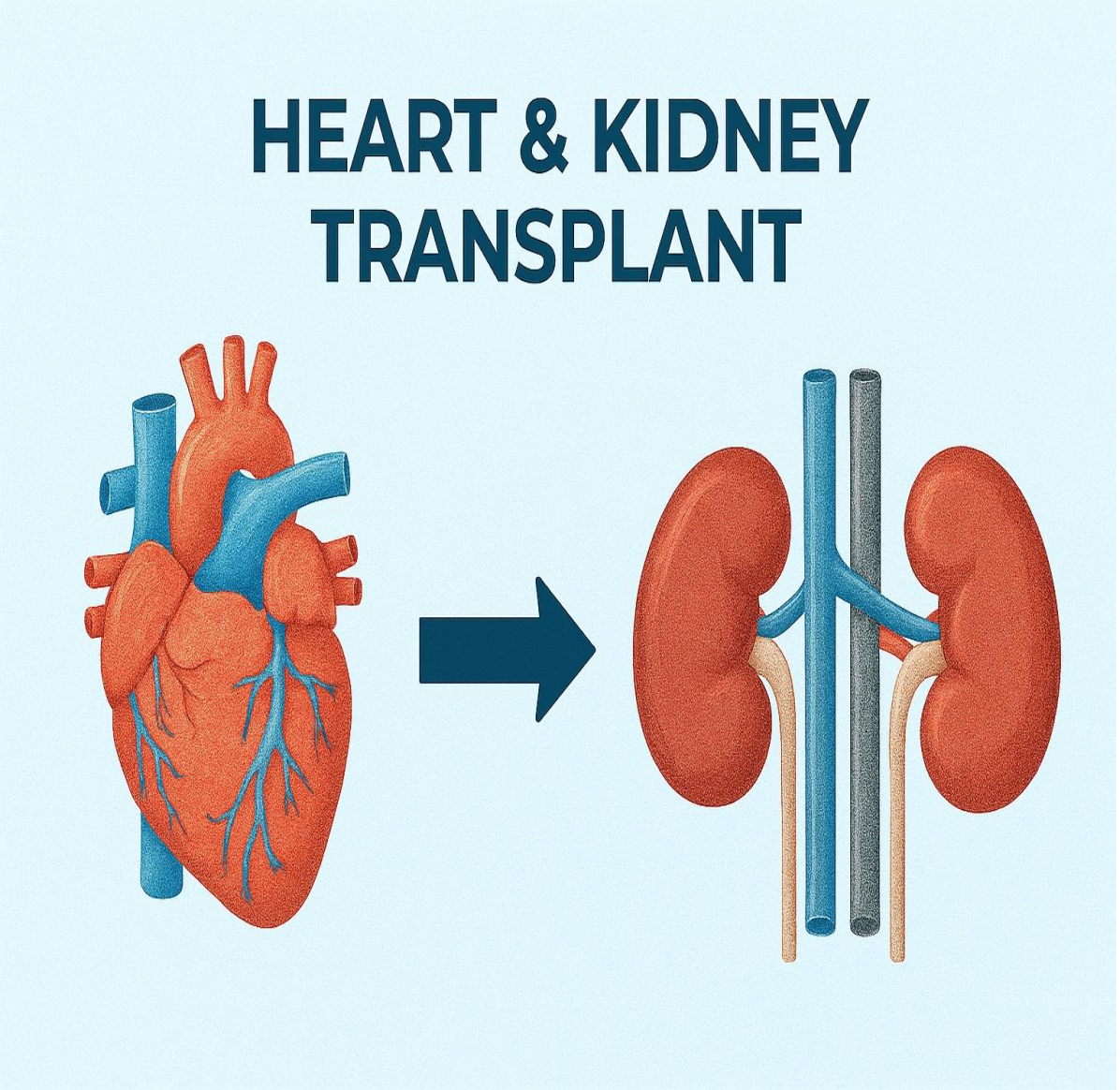


Conclusion

Simultaneous heart and kidney transplantation is an **important option** for concurrent cardiac and renal dysfunction and has **acceptable** rejection and survival rates.

SAMPAIO, et al. Transpl. Int. 2024
doi: 10.3389/ti.2024.12750

- Combined Heart and Kidney Transplant (10/6/2025)

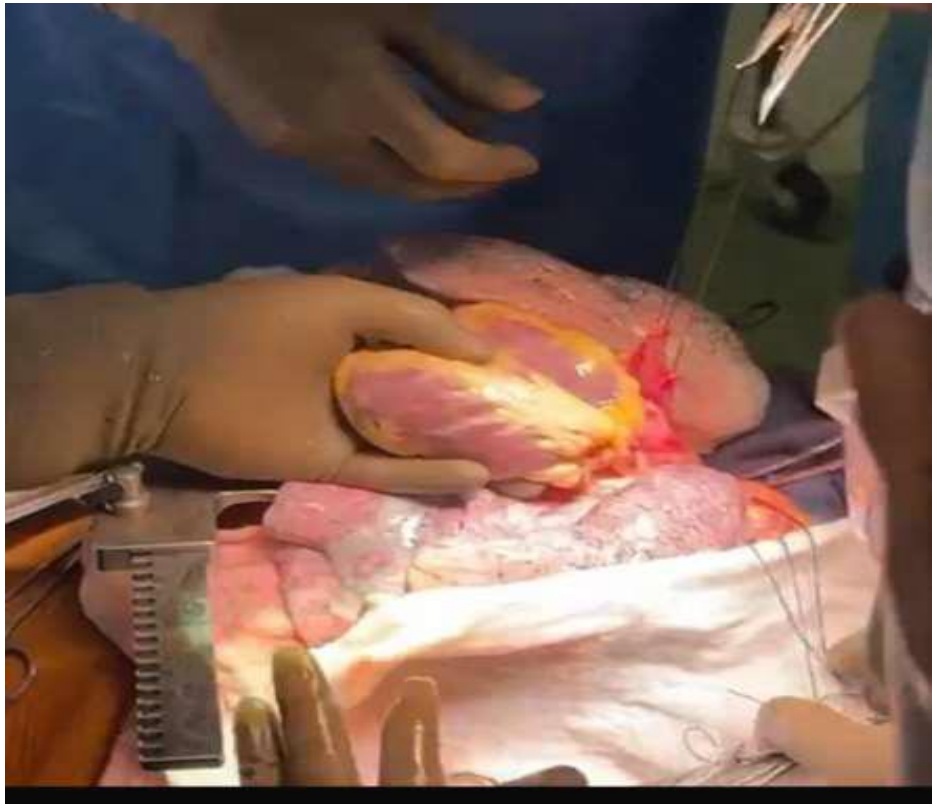


Challenges

1	Dual organ	Performing dual organ transplant -Rare entity
2	Time	Cold ischemia time Heart 6 hr and Kidney 12 hr
3	Perfusion	Balancing perfusion of both grafts
4	Rejection & Infection	Susceptibility to rejection, sepsis and opportunistic infection

Intraoperative course

- Well maintained cadaveric grafts
- Significant blood loss- 1800ml transfusion
- Transvenous pacing
- Multiple Ionotropes, PA cath in situ
- Shifted to ICU



ICU Stay

- MV (SIMV PC + PS) & transient nitric oxide 30ppm.
- On Inotropic support-
  Noradrenaline , Adrenaline
  Dopamine, Isoprenaline
- Sedation-
  Fentanyl+Dexmedetomidine
- Intravenous fluids
  Initiated based on advanced hemodynamic monitoring.
- Broad-spectrum antibiotics
  Ceftazidime Avibactum
  Aztreonam

Immediate Post operative period

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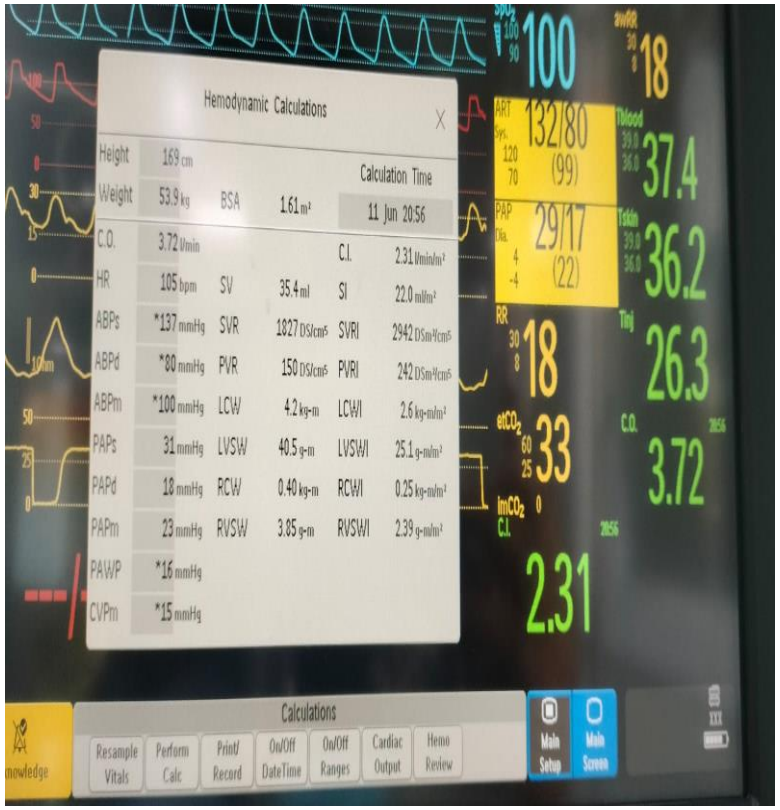
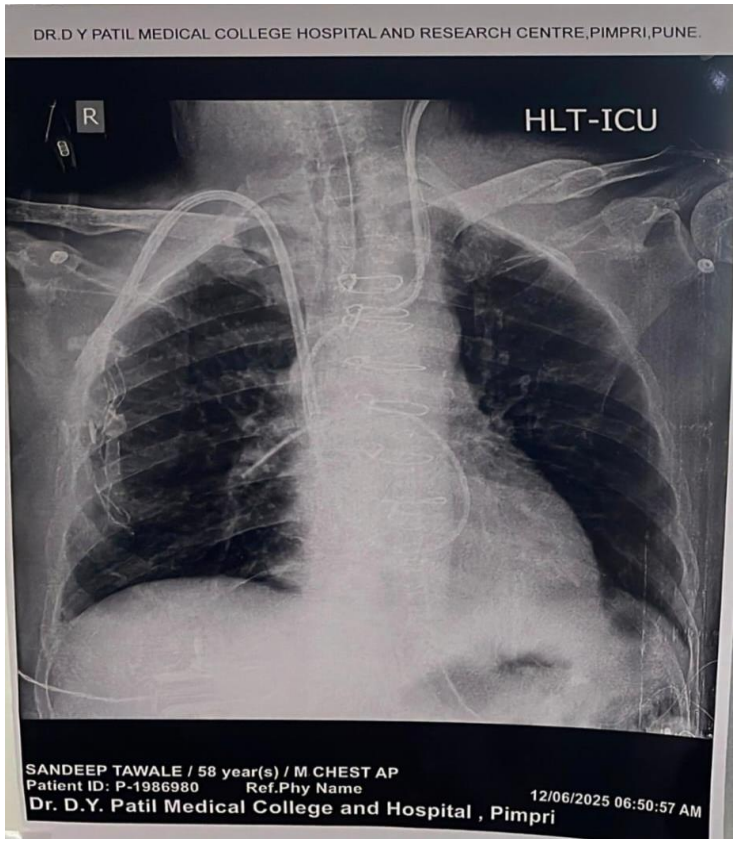
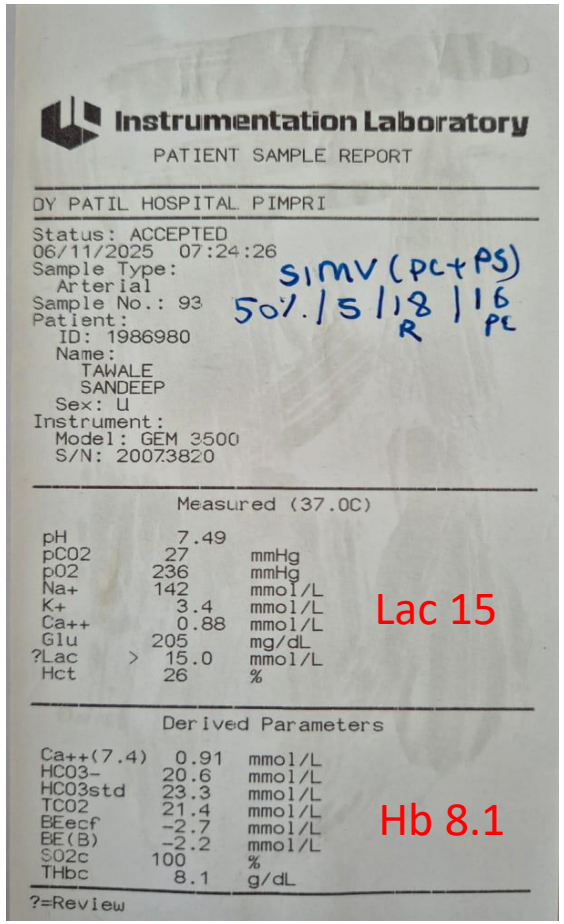






Inoptropic support
Paced ventricular rhythm

Inhaled NO

Good urine output

Laboratory values(Immediate post op)

	11/06	12/06
HB	**7.50**	11.50
TLC	11700	**16300**
Platelet	113000	**68000**
Urea	89	135
Creat	**4.40**	**3.89**
Na	148	146
K	3.5	3.6
Cl	94	98
Albumin	3.1	3.6

Immunosuppressive therapy

Induction

- Inj MPS 1gm IV
- Inj ATG 1.5mg/kg

Maninatainance

- Mycophenolic acid
- MPS
- Tacrolimus

Titrated dosages as per the TDM

Heart	Kidney	Heart+Kidney
• Tacrolimus • MPS	• Tacrolium • MPS	• Mycophenolic acid • Methylprednisplone • Tacrolimus

Post operative Day -1

- Recived blood products.
- Inotropic support tapered gradually.
- CPAP trial given -->tolerated extubation was done.
- Uneventfull transitioned to nasal prong.

	12/06 (SIMV)	12/06 (CPAP)	12/06 (NP)
pH	7.46	7.49	7.38
pCO2	27	37	45
pO2	231	182	135
Hco3	19.2	28.2	29.0
Lac	**9.6**	**2.0**	1.2
P/F ratio	462	455	465

Post operative challenges in the ICU

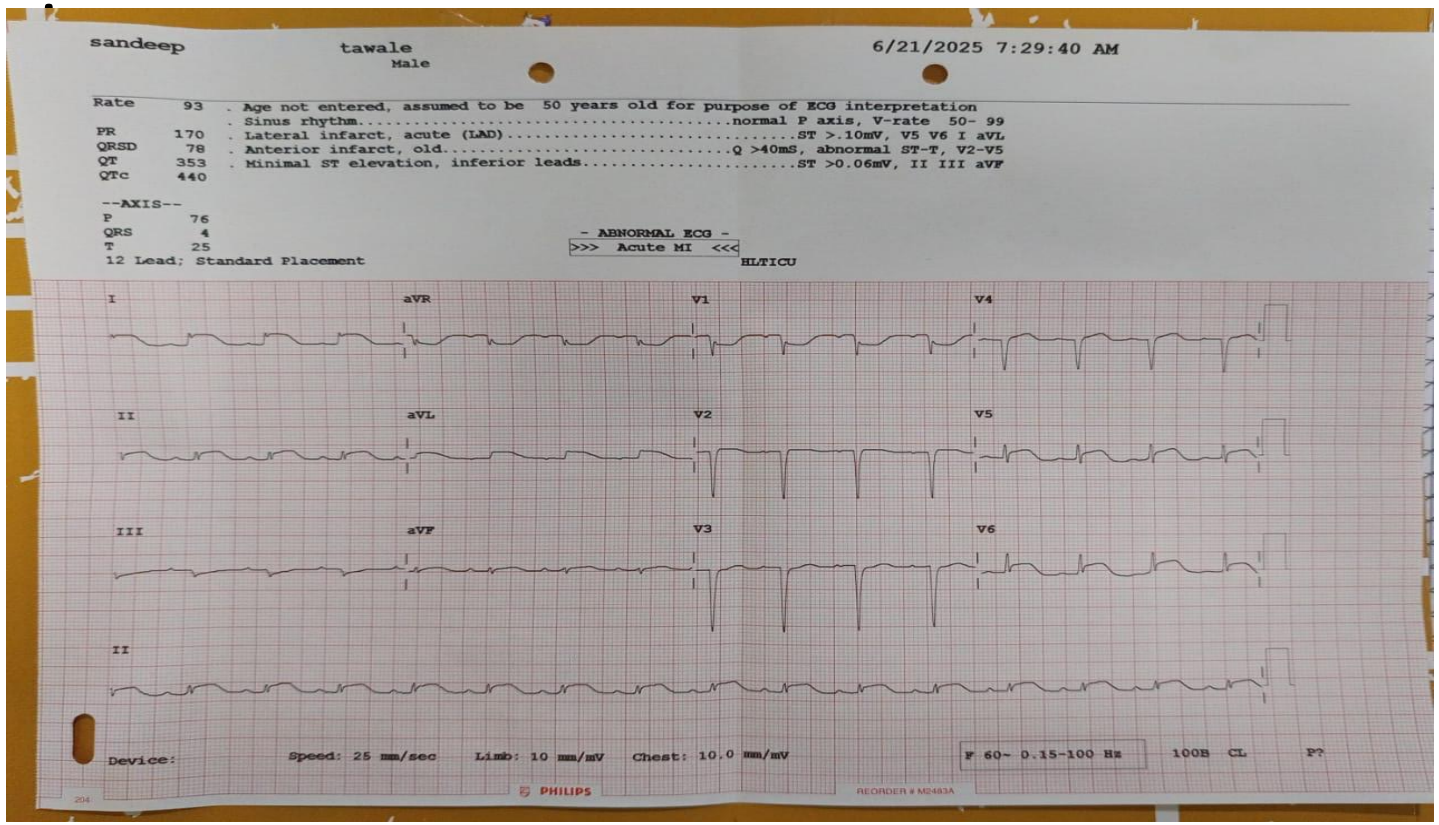
1. Drop in urine output
2. Deranged renal function test
3. Metabolic acidosis
4. Breathing difficulty

Cardiac complications

- Desaturation
- ECG Changes
- Hypotension
- ECHO- Drop in LVEF,

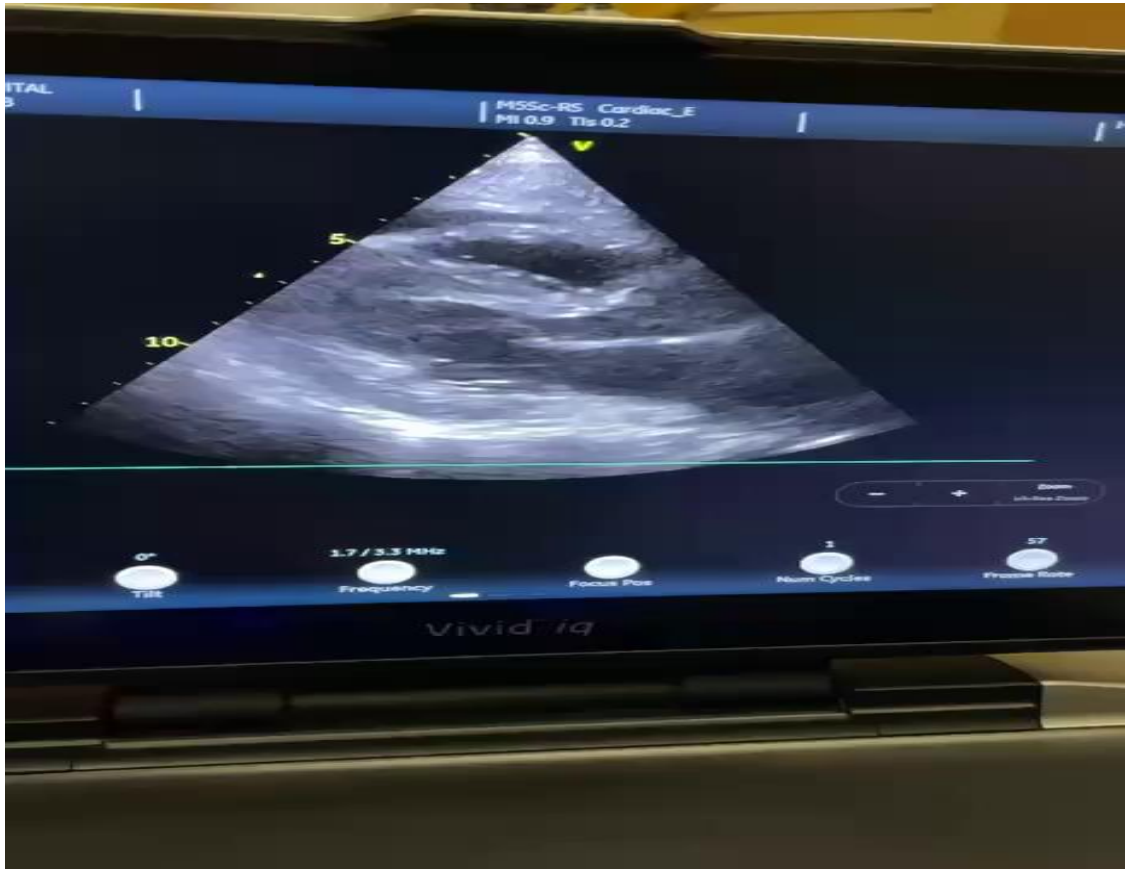
Mild to moderate pericardial effusion

- Rise in ProBNP



- Pulmonary edema secondary to cardiac dysfunction

- Pericardial fluid- Surgical subxiphoid pericardial drainage



Differential diagnosis

- Graft failure
- Delayed graft function
- Acute tubular necrosis
- Rejection of organ grafts

How did we manage it?

- Expert team of cardiologists, nephrologists, CVTS surgeon and Intensivists
- Diagnosis of Antibody mediated rejection was made
- 3 cycles of PLEX, IvIg along with 3 immunosuppresants
- CRRT & Hemodialysis followed by diuretics
- Intermittent NIV support, ionotrops
- Prophylactic Antimicrobial and antifungal agents

Post operative Day 20

- Off inotropic support
- Good urine output
- Drains removed
- Antibiotics de-escalated

.

Updatess on cutlures

Date	Investigation	Report
10/06/25	Blood culture	No growth
13/06/25	Blood culture	No growth
14/06/25	Blood culture	No growth
14/06/25	Urine culture	No growth
18/06/25	Blood culture	No growth
25/07/25	Blood culture	No growth
02/07/25	Blood culture	No growth
04/07/25	Urine culture	No growth
05/07/25	Blood culture	No growth

Nutrition and Physiotherapy

- Polymeric feeds with adequate calories and protein
- Restricted sodium/ potassium intake
- Incentive spirometry exercises
- Active range of motion exercises for B/L UL and LL
- Static cycling Ambulation / Stairs

1st time in the history of Indian Dual organ (HK)transplant

Post operative Day 25

- A Successful Discharge

DPU Super Specialty Hospital Performs India's First Simultaneous Heart and Redo Kidney Transplant

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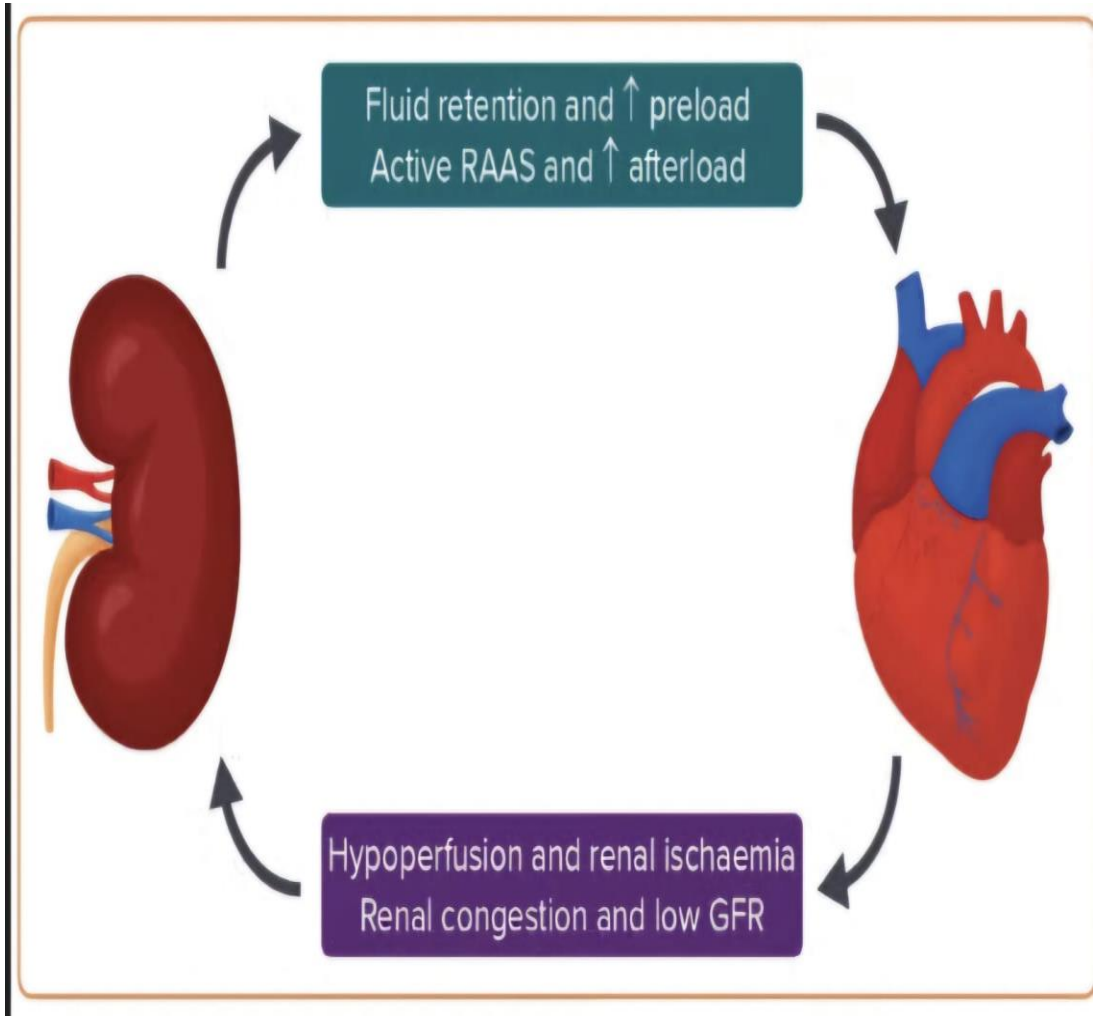
Updated At : 04:51 PM Aug 06, 2025 IST

Heart-Renal cross talk



- Fluid mangement
  Conservative v/s Liberal fluid
- Balancing perfusion
- Cross infection risk

Learning Points

- Post combined Heart Kidney Transplant
- Primary Graft dysfunction
- Ventricular failure
- Fliud mangement

DPU organ transplant statistics

Lung Transplants -35

Heart and Lung Transplants -05

Heart Transplants -04

Simultaneous

Kidney+Pancreas Transplants - 04

Simultaneous Liver +Kidney Transplants -2

Kidney Transplants- 205

Liver Transplants- 66

THANK YOU...

- Dr Prachee Sathe
  Professor and HOD CCM

- Dr Prashanth Sakhavalkar
  ICU Incharge & Associate Professor-CCM

- Dr Asir Tamboli
  HLT ICU incharge& Assistant Professor-CCM

- Critical care medicine staff

Thank You...

- Transplant Surgical Team
- Department of Nephrology
- Department of Cardiology
- Department of Anaesthesiology
- Department of Radiology
- Department of Microbiology
- Department of Pathology
- Nursing Staff
- Physiotheraphy & Dieticians

Special Thanks to

- Hon’ble ProChancellor Madam!