

Renal Replacement Therapy - Indication and Follow up

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Primary Functions of the Kidney

- Removal of metabolic wastes, drugs and other toxins
- Fluid Balance
- Electrolyte Balance
- Acid-Base Regulation
- Blood Pressure Control
- Hormone Production ~ Erythropoietin, Vitamin D (Calcitriol), Renin

“Master Chemists of the Body”

Renal Impairment

2 simple tests will identify

- **eGFR**
- **UACR**

Renal Impairment



ACUTE
CHRONIC

Acute/Chronic

◎ History:

1. DM,
2. HTN,
3. MSK disease.
4. Obstruction,
5. CV disease,
6. Family history
7. H/O of Azotaemia
8. Any acute illness ?
9. Any new drug ?
10. Any H/O shock ?

Acute/Chronic

- **Look**
- **Color**
- **Breath**
- **Skin**
- **Hair**
- **Fluid status**
- **Nail**
- **Abdomen**
- **Neuropathy**

Acute/Chronic

Investigation;

- Previous abnormal values.
- Anaemia
- Hyperkalaemia
- Hypercalcaemia, Hyperphosphataemia
- Small kidneys with loss of cortical echo/ polycystic/ hydronephrosis
- Enlarged kidneys with swollen cortex.

AKI

AKI

Features of active disease/Injury

- I. Oliguria**
- II. Loin pain**
- III. Hyperkalaemia**
- IV. Acute/Severe hypertension**
- V. Nephrotic syndrome**
- VI. Proteinuria with haematuria**
- VII. Colic**
- VIII. Acute systemic symptoms (arthritis, fever, rash, vomiting, diarrhoea)**

AKI, Role of Primary Physician

Early referral

- **Fluid management**
- **BP**
- **Electrolyte**
- **Symptom management**
- **Addressing the cause**

Who Should be Evaluated For CKD ?

Who should have a renal evaluation

1. **DM**
2. **HTN**
3. **CV Disease**
4. **PAD**
5. **Rheumatologic disease**
6. **Obstruction/Structural disorder**
7. **Family H/O kidney disease**
8. **Incidental albuminuria/haematuria**
9. **On prolong nephrotoxic like NSAID, lithium**

CKD

The perils of using serum creatinine to “guess” level of renal function

	24-yr Black Man	60-yr White Man	60-yr White Woman
SCr	1.3 mg/dL	1.3 mg/dL	1.3 mg/dL
GFR as estimated by MDRD Study equation	≥60 mL/min/1.73 m²	60 mL/ min/1.73 m²	44 mL/ min/1.73 m²

What Primary Care Providers Should Do?

- **Diagnosis, evaluation, follow up of early CKD patients**
- **Counseling the patients about CKD and stages of treatment**
- **Dietary and nutritional guidance**
- **Focus on good glycemic control in people with diabetes**

What Primary Care Providers Should Do?

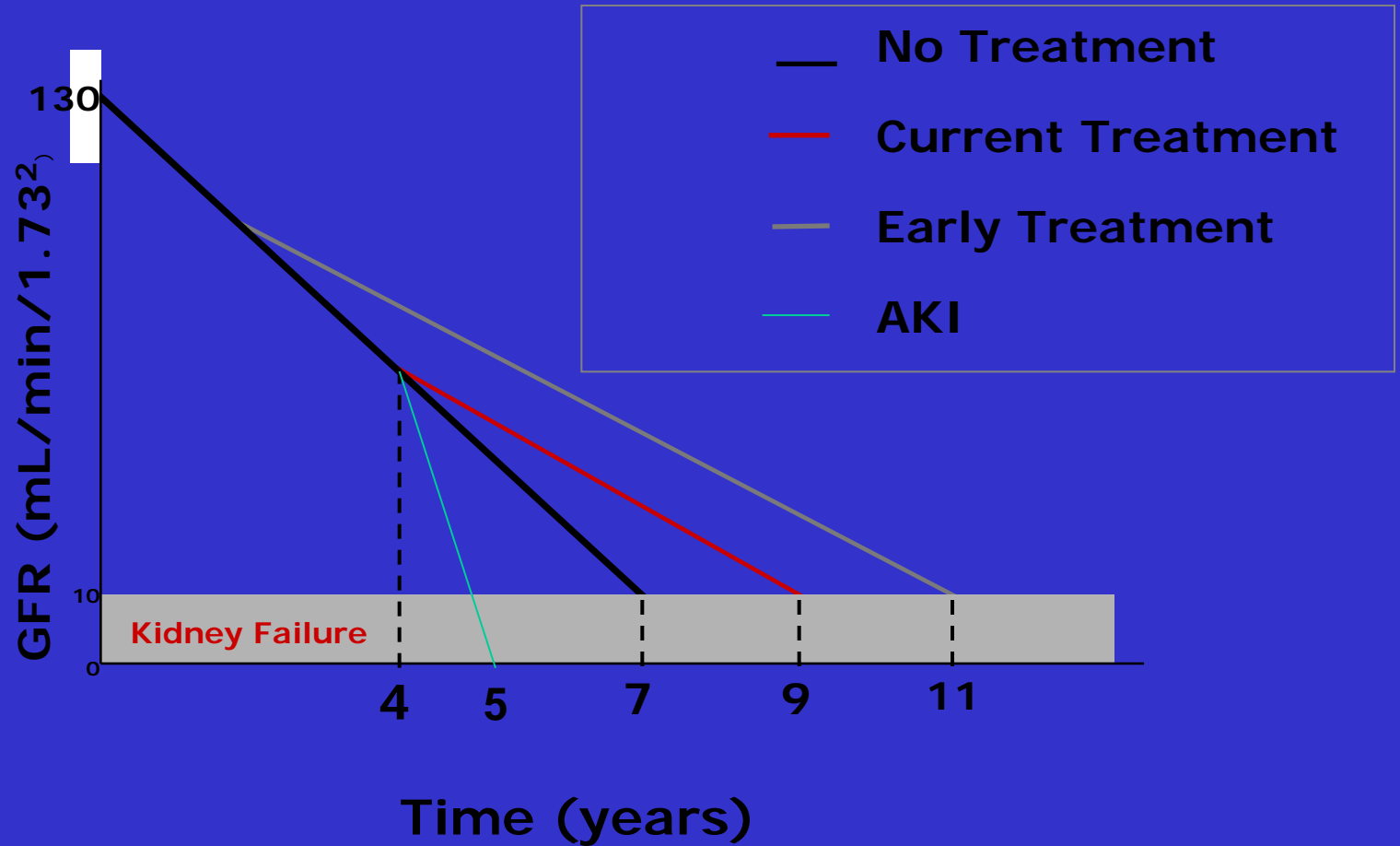
Managing Blood Pressure in CKD :

- Blood pressure below 130/80
- Use an ACE inhibitor or ARB
- More than one drug is usually required
- A diuretic should be part of the regimen

What Primary Care Providers Should Do ? (Continued)

- **Monitor eGFR and UACR**
- **Treat cardiovascular risk, especially with smokers and hypercholesterolemia**
- **Screen for anemia (Hb), malnutrition (albumin),**
- **Immunization**
- **Team with a nephrologist**

Early treatment can make a difference



SAVE the Non-Dominant Arm for Vascular Access

When GFR < 30 mL/min

- No BP measurement
- No IV
- No Blood Draws

*On Non-Dominant
Arm*

Place vascular access within a year
of hemodialysis anticipation ...

CKD - V

CKD - V

- **Metabolic acidosis**
- **Hyperkalemia**
- **Refractory fluid overload**
- **Uraemia : pericarditis,
neuropathy,
decline in mental status ,
anorexia compromising
nutrition,**

Indications for RRT

A : Metabolic acidosis (pH less than 7.1)

E : Electrolytes - Hyperkalemia ($K > 6.5$ meq/L) or rapidly rising K, Na - ≥ 150 or ≤ 120

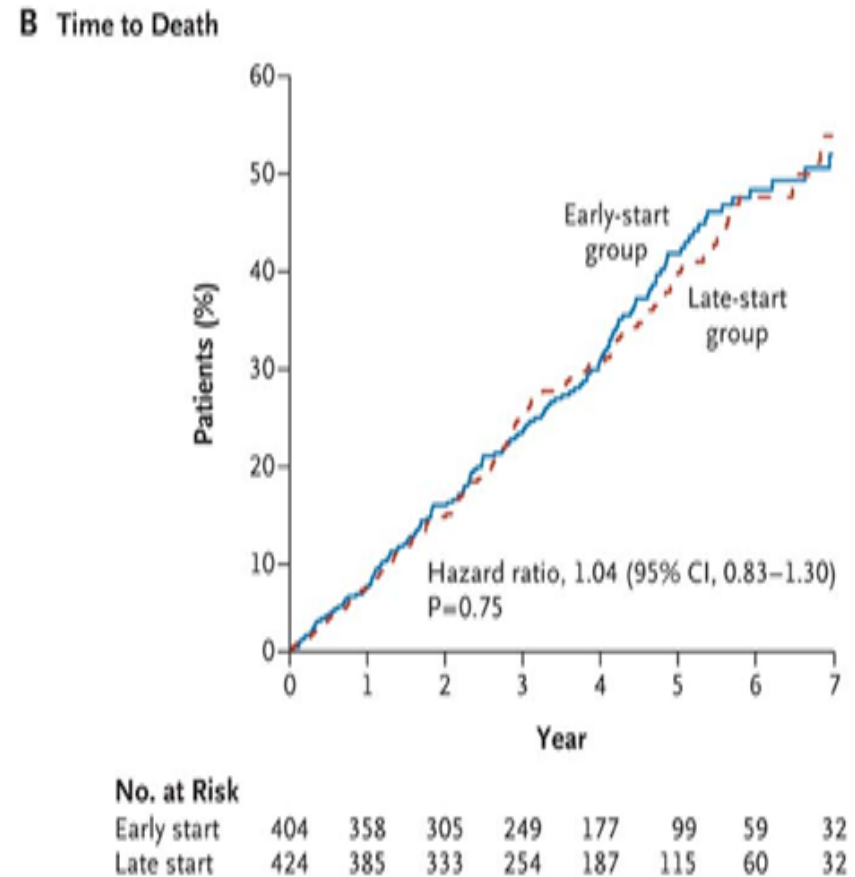
I : Ingestion - Certain alcohol and drug intoxications

O : Refractory fluid overload

U : Uraemia ie. pericarditis, neuropathy, decline in mental status, anorexia compromising nutritional state

IDEAL Study: K-M Curves for Time to the Initiation of Dialysis & for Time to Death

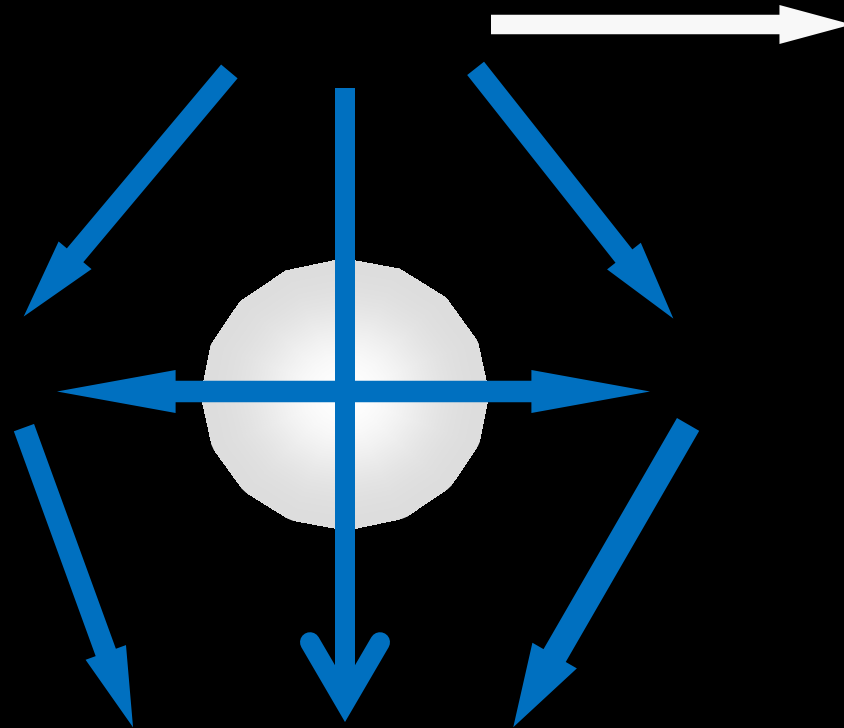
- Between July 2000 & November 2008
- Australia / New Zealand
- 828 adults
 - Early start: eGFR 10-14 cc/min
 - Late start: eGFR 5-7 cc/min
- Mean age 60.4 years
- 542 men & 286 women
- 355 with diabetes
- Median follow-up 3.6 years



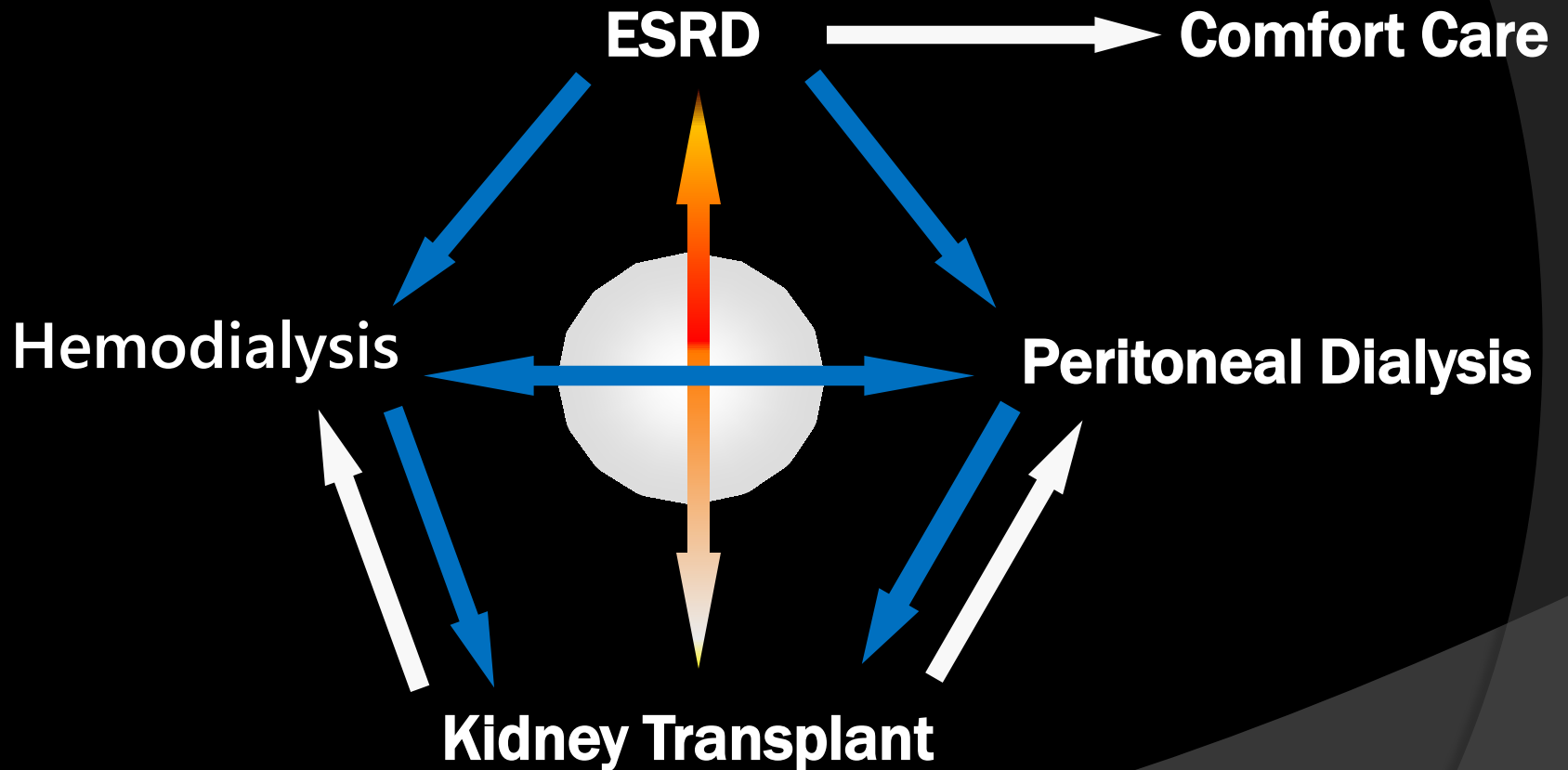
Implications

- **Total of 75.9% of the patients in the late-start group started dialysis when eGFR was > 7.0 mL/min/1.73m², owing to the development of symptoms!**
- **In this study, planned early initiation of dialysis in patients with stage V CKD was not associated with an improvement in survival or clinical outcomes (QOL)**
- **Dialysis initiation should be based upon clinical factors (symptoms) rather than eGFR alone**

Treatment Options for Renal Replacement Therapy



Renal Replacement Therapy



Where are we - too many questions?

- ◎ **What therapy should we use?**
- ◎ **When should we start it?**
- ◎ **What are we trying to achieve?**
- ◎ **How much therapy is enough?**
- ◎ **When do we stop/switch?**
- ◎ **Can we improve outcomes?**

...are help us?

Choice of Therapeutic Modality: AKI

Haemodialysis

- 1) Hyper catabolic state**
- 2) Extensive abdominal adhesions**
- 3) Recent abdominal surgery**
- 4) Fresh intra-abdominal vascular graft**
- 5) Complicating severe lung diseases**

Preferred Patient for PD

- 1. Infants and very young children**
- 2. Patients with severe cardiovascular disease**
- 3. Patients with difficult vascular access (eg.DM)**
- 4. Patients who desire greater freedom to travel**
- 5. Patient who wish to perform home dialysis but do not have a suitable partner to assist them**
- 6. Patients who remain long away from**

HD, Modality

- ◎ **Intermittent hemodialysis (IHD)**
- ◎ **Continuous renal replacement therapy (CRRT)**
- ◎ **Hybrid therapies, like SLEDD**

RRT in sepsis/MODS

- ◎ **Haemofiltration has been proposed as a “Extracorporeal blood purification therapy (EBPT)” as adjuvant therapy for sepsis/MODS for removal of harmful inflammatory mediators or endotoxemia**

RRT in congestive heart failure

- ◎ **Slow continuous ultrafiltration (SCUF) effective for fluid removal in decompensated CHF**
- ◎ **UF associated with improved weight and fluid removal, and ↓ 90 d rehospitalization and medical visits for CHF**

Follow up – Patients on Dialysis

Dialysis adequacy

- I. Symptoms
- II. Fluid status
- III. Nutrition
- IV. BP
- V. Anaemia
- VI. Jaundice

High Blood Pressure

Target blood pressure:

- **Dialysis:**
 - **Predialysis: <140/90 mm Hg**
 - **Postdialysis: <130/80 mm Hg**
- **Transplantation: 130/80 mm Hg**
- ◎ **Managing high blood pressure in dialysis requires attention to fluid status and antihypertensive medications.**
- ◎ **ACEI/ARB + Diuretics + β blocker + CCB + α block**

Adequacy of access

- I. Normal flow in fistula**
- II. Properly functioning PD cath**

Haematology/biochemistry

- I. Hb
- II. Albumin
- III. Iron
- IV. LFT
- V. Uric acid
- VI. Lipids
- VII. Ca, PO₄
- VIII. Viral markers

CV Work up

- I. ECG
- II. CXR
- III. ECHO
- IV. ETT
- V. CAG

Immunization

- ◎ **Influenza vaccine annually, unless contraindicated.**
- ◎ **Polyvalent pneumococcal vaccine:**
 - **Offer revaccination within 5 years.**
- ◎ **Typhoid**
- ◎ **HBV if not already vaccinated**

Adequacy of dialysis

URR - $\geq 65\%$

Kt/V - ≤ 1.2

— Nephrology Center

Tool	Goal	Jan	Feb	Mar	Apr
Kt/V	≥1,2	1.1	1.3	1.2	1.1
URR	≥ 65%	64	66	65	65
Hb	11-12	9.5	10.5	11.0	11.0
Target wt	65 Kg	66	67	66	66

What About No Renal Replacement Therapy Option?

Starting Dialysis in the Elderly...Or Not?

- ❑ Those who Cannot afford.
- ❑ Among patients > 75 yrs with stage 5 CKD who may chose **NOT** to start dialysis:

Starting Dialysis in the Elderly...Or Not?

- Overall, more likely to die over next One year
- But if they had ischemic heart disease or other significant comorbidity → NO DIFFERENCE in survival with RRT
- Active disease management and supportive care may be appropriate without starting dialysis in the ill elderly

Must have end-of-life discussions!



Thank you
for your attention

