



AKI



AGENDA

AKI Worldwide

Why PD ?

How to prescribe it ?

What are common complications ?

Is it better than other options ?

ISPD guidelines

Conclusion

Acute Kidney Injury Contributes to Mortality Worldwide



High-income countries:

300 thousand/year

Low- and middle-income countries:

1.4 million/year

The Increasing Frequency of Dialysis-Requiring AKI

Hsu et al JASN 24:37, 2013

BRIEF COMMUNICATION www.jasn.org

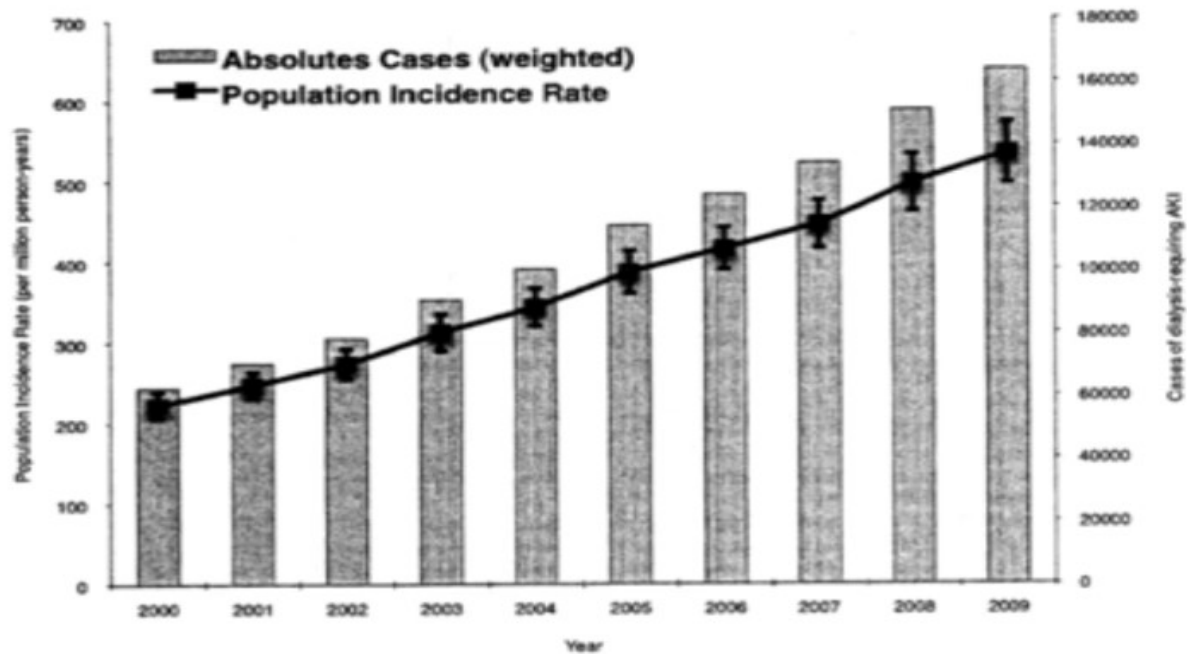


Figure 1. Population incidence of dialysis-requiring AKI in the United States from 2000 to 2009 (absolute count and incidence rate per million person-years). I bars represent 95% CIs for incidence rates. The number of cases of dialysis-requiring AKI increased from 63,000 in 2000 to almost 164,000 in 2009; the population incidence increased at 10% per year from 222 to 533 cases/million person-years.

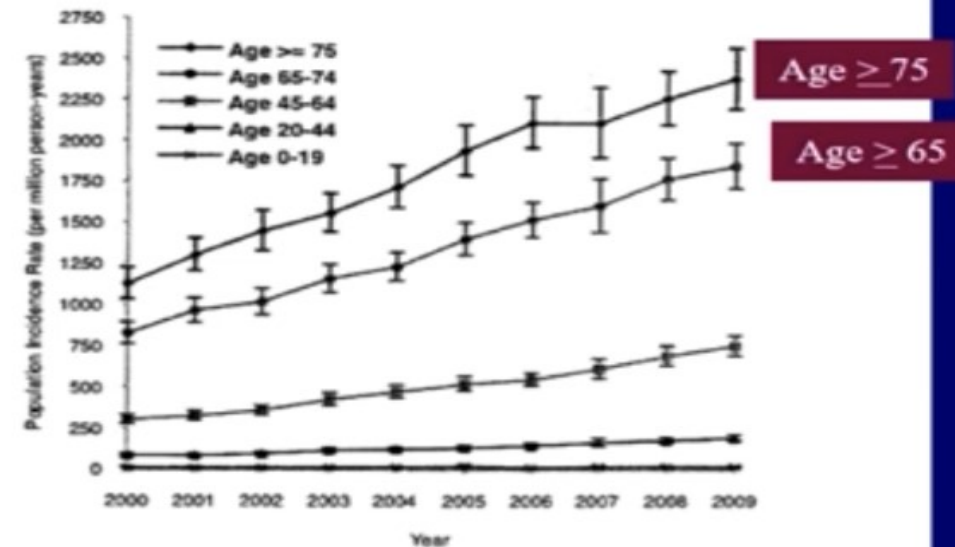


Figure 2. Population incidence of dialysis-requiring AKI in the United States by age groups from 2000 to 2009. I bars represent 95% CIs for incidence rates. All age groups showed a similar pattern of increase in incidence.



ISN

INTERNATIONAL SOCIETY
OF NEPHROLOGY

Oby25

AKI INITIATIVE

ISN “ 0 BY 25 ”

- Proposed by Giuseppe Remuzzi ISN president in Hong Kong 2013.
- Eliminate preventable deaths from AKI worldwide by 2025 focus on LMIC .
- Globally applicable strategies to permit a timely diagnose of AKI and provide access to RRT for patients with potentially reversible AKI .



IS PD AN ACCEPTABLE
TREATMENT FOR AKI

?



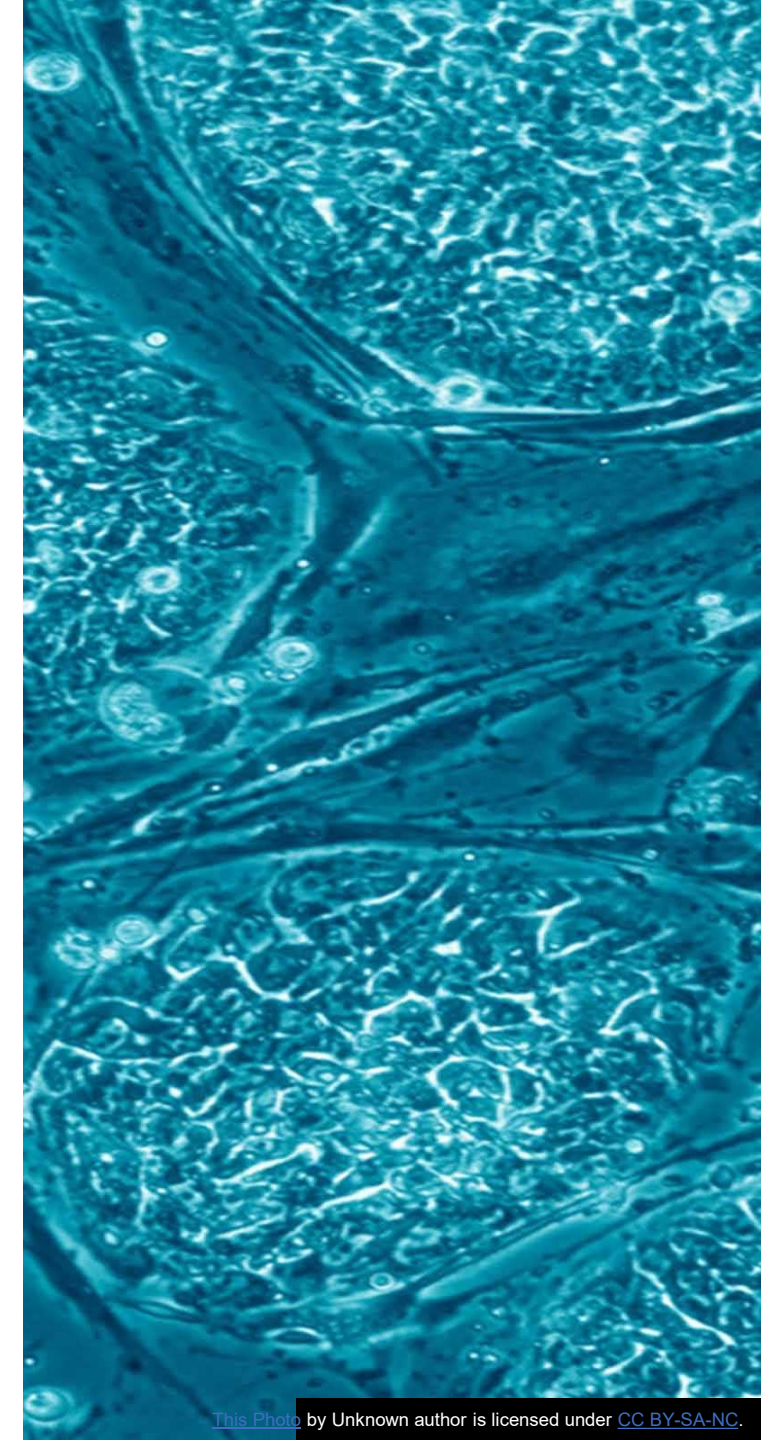
IS PD AN ACCEPTABLE
TREATMENT FOR AKI

YES



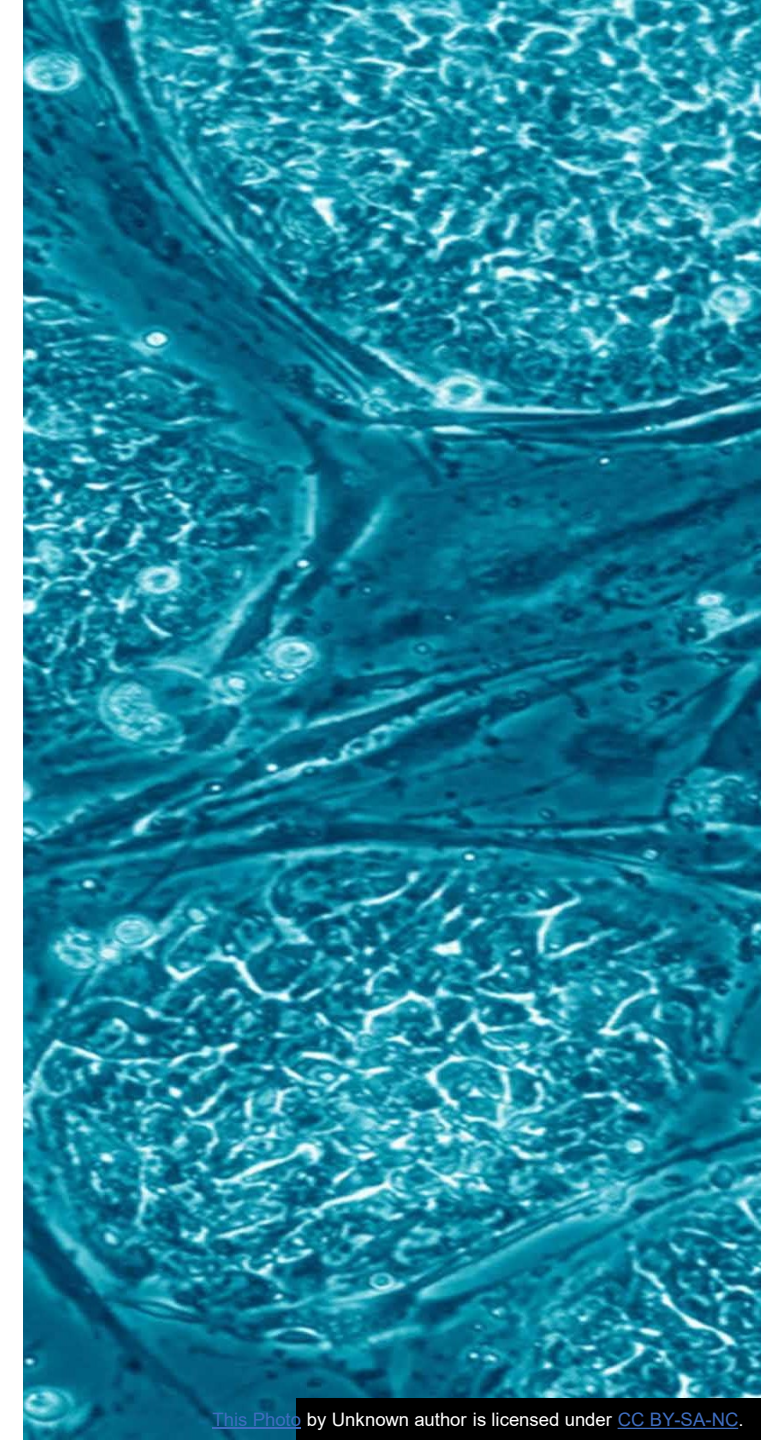
PROS

- Simple technique
- No anticoagulation
- Hemodynamically unstable patients
- Low risk of bleeding
- Low risk of electrolytes disorders
- Less expensive



CONS

- PD related complications
- Low efficiency
- Uncontrolled UF
- Need to peritoneal integrity



CRRT/PD



PIRRT/
SLED



IHD

Hemodynamic stability
Stability of intracranial pressure

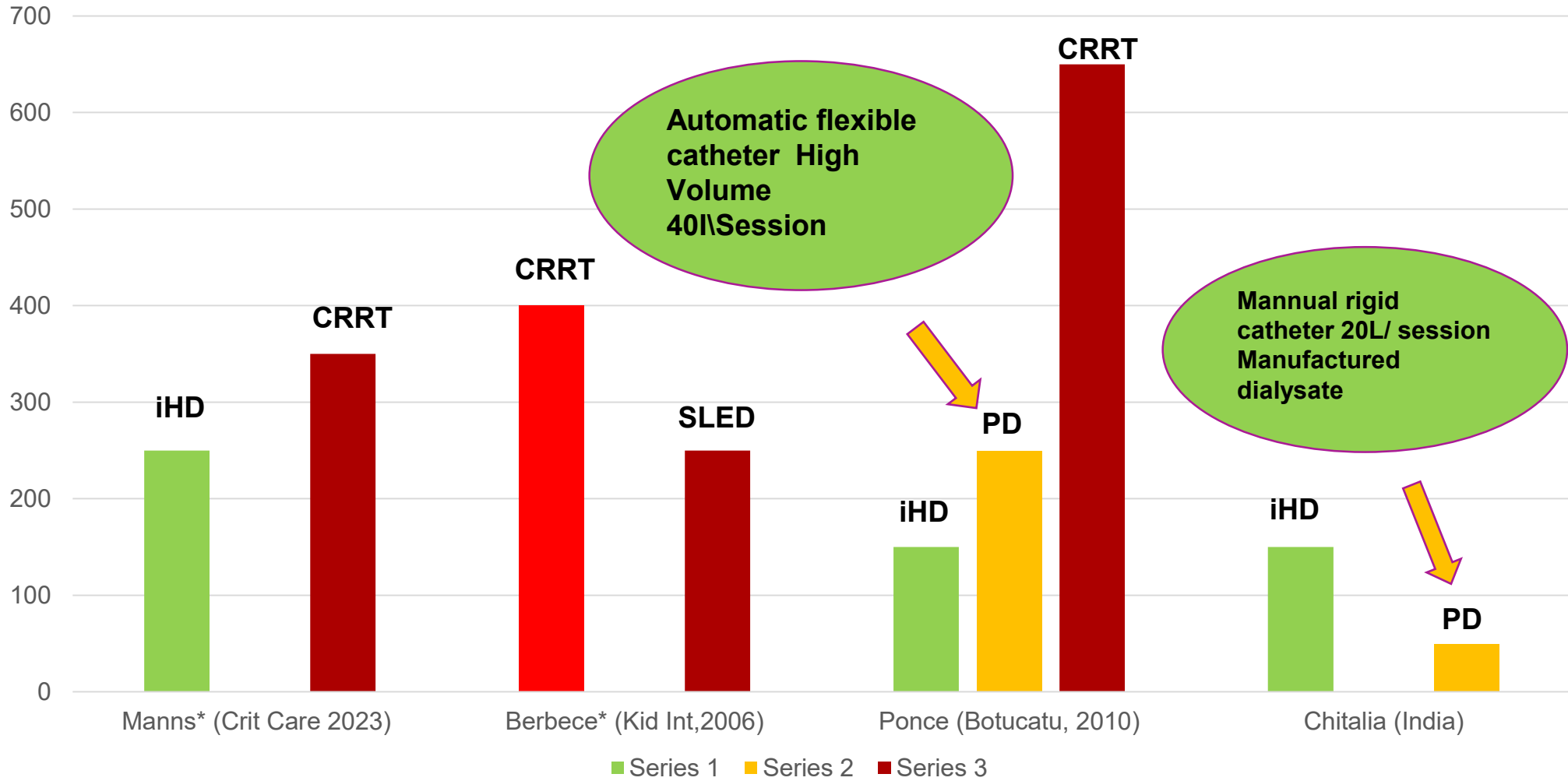
Rate of fluid removal
Rapidity of metabolic and acid base correction
Risk of osmolar shifts

Risk of infections
Immobilisation

Speed of small solute clearance, incl potassium, drugs

US\$/dia

Costs of dialysis therapy in AKI





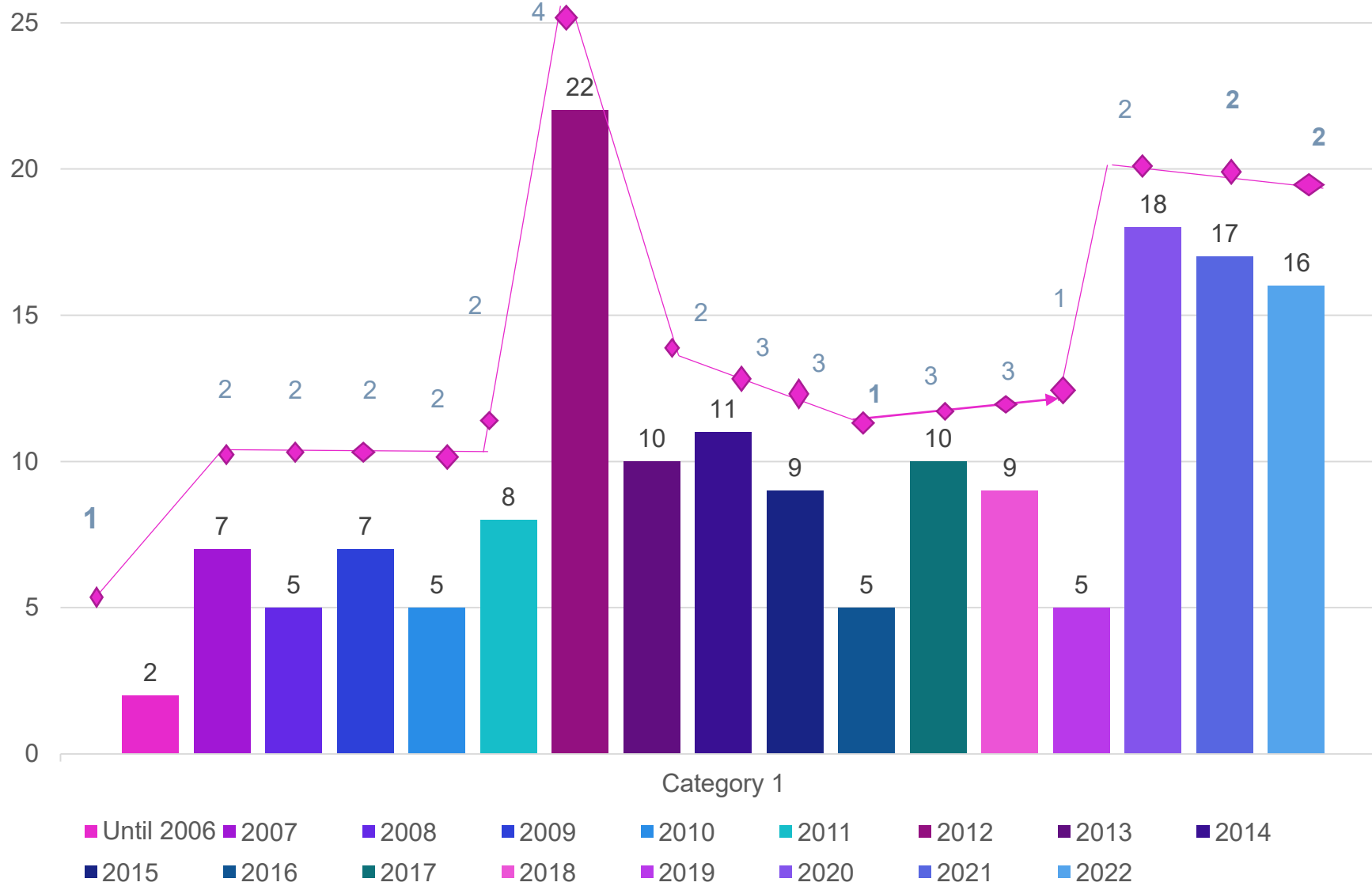
PD use in AKI has been incremented during the last years as in 2005 was 2% to 20% in 2020 .

The interest to use PD in treating AKI has been increasing worldwide .

In some African countries PD is the only available RRT method to treat AKI .

PD in AKI

PubMed: number of studies



ISPD guidelines for peritoneal dialysis in Acute Kidney Injury: 2020 guidelines

PD PRESCRIPTION IN AKI

- Dialysis access flexible double cuff PD catheter where involvement of nephrologist in the procedure will result in better PD
- APD (CCPD)
- Continuous PD (CAPD)
- HVPD



PD PRESCRIPTION IN AKI

Glucose based solutions are the choice with limitation to icodextrin and amino acids solutions

Bicarbonate buffered rather than lactate buffered solutions specially among shocked or liver failure patients to avoid metabolic acidosis

When necessary use of manufactured solutions can be prepared using IVF as a base solution , preferably in a pharmacy manufacturing unit or with in the clinical center where they will be used .



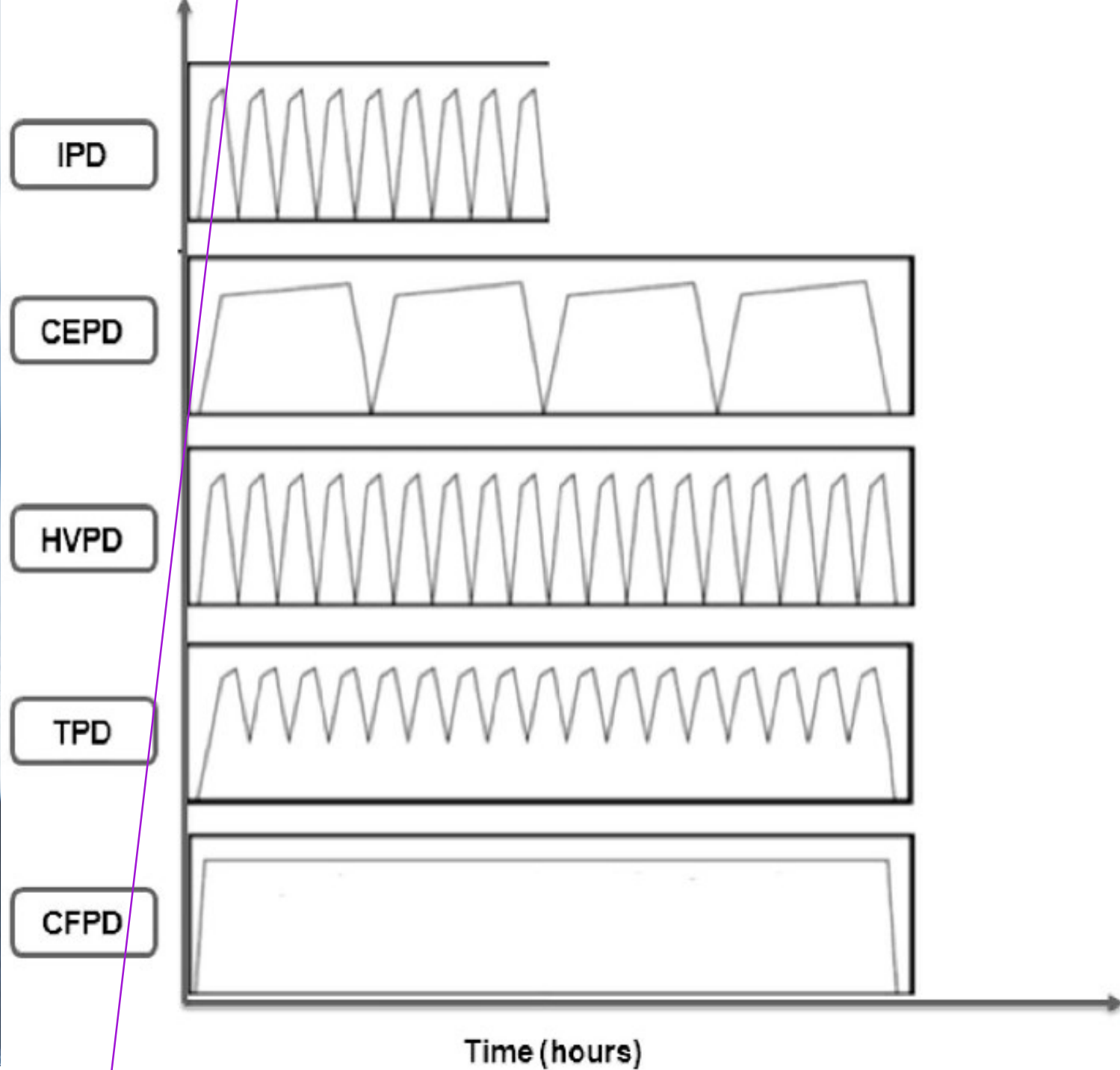


MODALITY OF ACUTE PD

Intermittent or continuous PD both can be performed depending on amount of fluid and solute removal desired

Can be Manual or using cyclers depending on availability , performed similar to the procedure among chronic PD patient

TPD & HVPD both can be Labor intensive and prone to infectious complications when performed without cycler



PRESCRIPTION

Dialysate

- 1.5%, 2.5% & 4.25%
- All glucose based solutions

Exchange volume

- The average exchange volume is 30 ml/kg
- can be lowered to 20 ml/L to avoid leak , GE reflux .

Dwell

- APD range from 30 to 90 minutes
- CEPD range from 3 to 6 hours .
- In chronic PD patient and in the presence of peritonitis we shorten the dwell .



TYPICAL HVPD PRESCRIPTION

□ 60kg woman with anuric AKI



Session duration 24hrs



Cycles 16



Dwell 1 hr



Inflow volume 2 L (33 ml/kg)



Total dialysate volume 32.4 L

A microscopic image of kidney tissue, showing various cellular structures and tubules in shades of blue and green. The image is positioned on the left side of the slide, partially overlapping a white diagonal line that separates it from the main text area.

DOSE OF PD IN AKI

Prescribed kt/v of 0.5 may not be necessary for many cases

Weakly Kt/v of 2.1 is acceptable

Considering early start of PD (BUN 75mg/dl)

Dialysis indications present: hyperkalaemia, acidosis, pulmonary oedema, encephalopathy

Flexible PD catheter

Rigid or makeshift catheter

Shock or Liver Failure?

Mix fluids using MRL/HS* + 50% Dextrose water

Yes

No

Bicarbonate buffered solutions

Standard PD solutions

< 60 Kg – 1500ml 120 minute cycles
 60-80 Kg – 2000ml 120 minute cycles
 80-100 Kg – 2000ml 90 minute cycles

Hyperkalaemia, acidosis and fluid overload corrected?

Yes

No

Weight (kg)	Total Dialysate Volume (l)	Volume per cycle (ml)	Cycles number	Cycles time (min)	dwll time (min)
50	8	2000	04	360	330
60	12	2000	06	240	210
70	14	2000	07	205	175
80	16	2000	08	180	150
90	20	2000	10	144	114

 Optimal
 Minimal Standard

* MRL – Modified Ringers Lactate HS Hartmanns Solution

COMPLICATIONS

Peritonitis

Respiratory failure

Protein loss

Hypernatremia

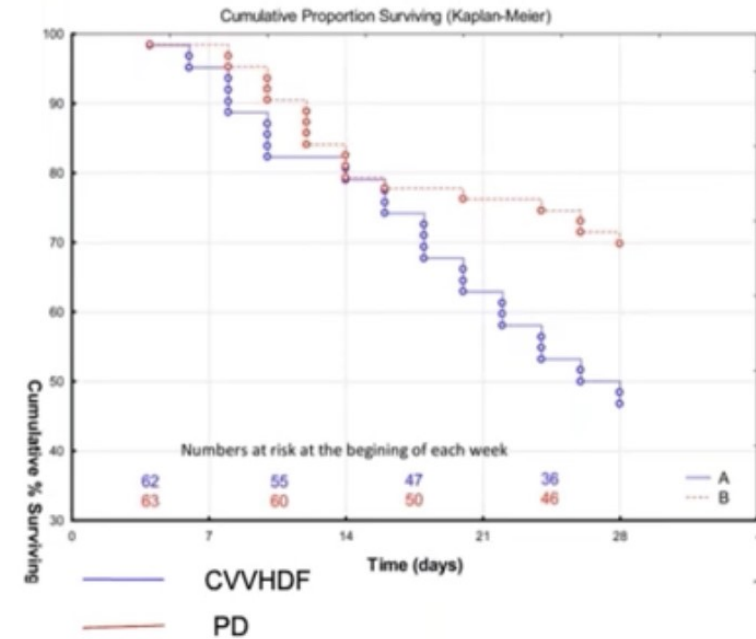
OUTCOMES WITH PD IN AKI

- PD in AKI has efficiency and survival comparable to HD and CKRT.
- 2017 Cochrane review of six trails and 484 patients with AKI patients treated with different PD Modalities were compared to those treated with extracorporeal therapies (HD , CKRT) there were no difference in all causes of mortality , renal function recovery or infections complications .
- A trail of 125 critically ill patients with AKI were randomly assigned to HVPD , TPD or CKRT at 28 days , patients treated with PD have higher rate of survival , renal function recovery and lower infectious complications and less intensive care unit stay .

Acute Kidney Injury in Critically Ill Patients: A Prospective Randomized Study of Tidal Peritoneal Dialysis Versus Continuous Renal Replacement Therapy

Abdullah Al-Hwiesh,¹ Ibrahiem Abdul-Rahman,¹ Fredric Finkelstein,² Jose Divino-Filho,³
Hatem Qutub,¹ Nadia Al-Audah,¹ Abdalla Abdelrahman,⁴ Nazeeh El-Fakhrany,¹
Mohammed Nasr El-Din,¹ Tamer El-Salamony,¹ Abdulsalam Noor,¹
Mohammed Al-Shahrani,¹ and Khalid Al-Otaibi¹

- 125 patients randomised to CVVHDF or Tidal PD
- CVVHDF – achieved 23ml/kg/hr
- Shorter time to recovery of renal function



ISPD GUIDELINES IN AKI

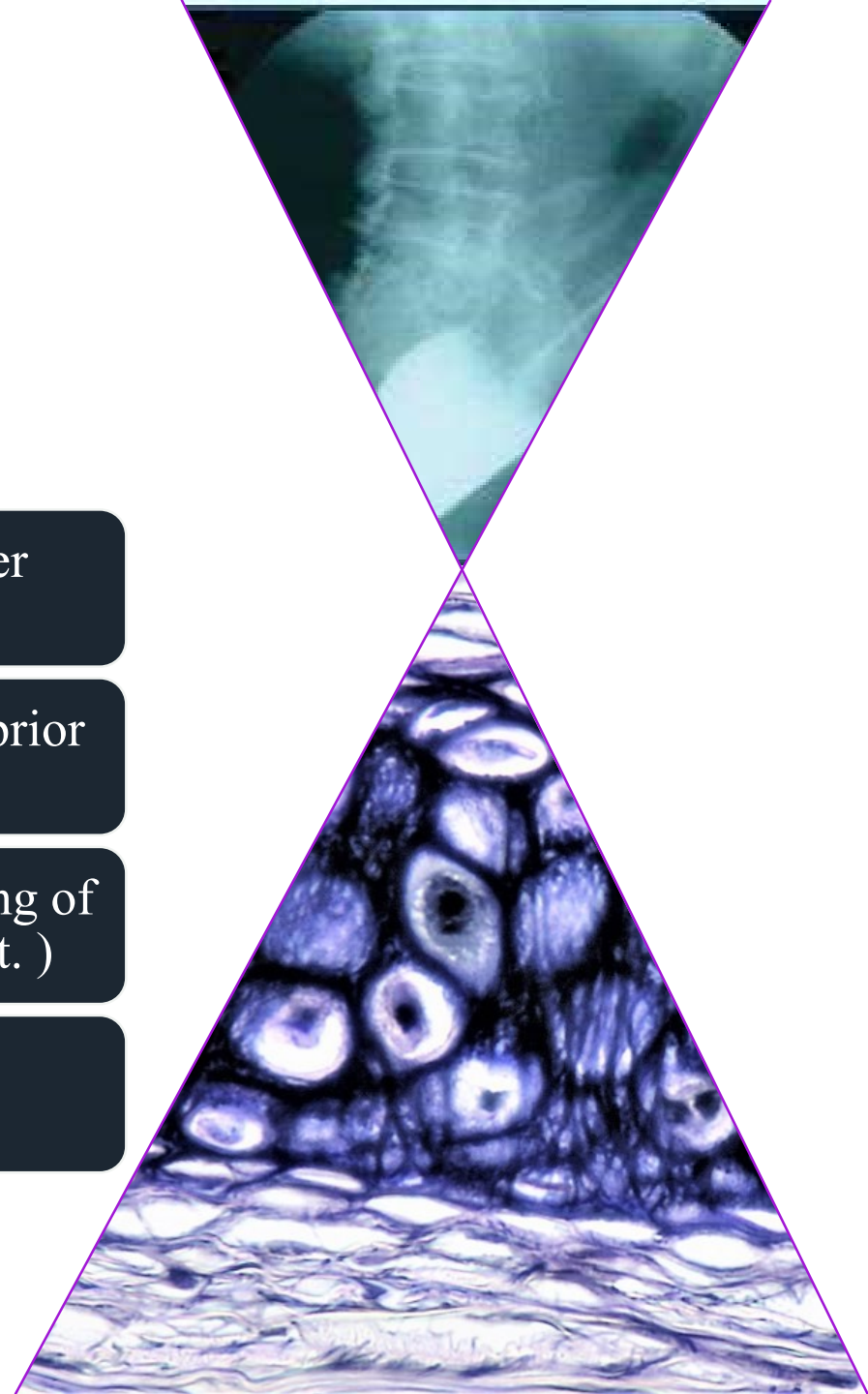
CATHETER AND FLUID :

Flexible PD catheter , semi rigid , rigid , NGT catheter implantation according to patient condition

Under aseptic condition and use of prophylactic AB prior to catheter implantation

Close delivery system Y connection (optimal) spiking of bags with shift connection can be considered (min. st.)

APD or CEPD acceptable



Bicarbonate buffered solutions are better , lactate buffered solutions are alternative

Commercial solutions are better , local prepared solutions are alternative

Measure serum K daily and once it falls below 4 mmol/l add K to dialysate or alternatively give oral or iv if possible

Short cycles 1-2h treat (uremia, hyperkalemia, overload & metabolic acidosis) where longer cycles 4-6h facilitate further more clearance of larger molecules solutes

Once U/O reach 1L/24h interrupt PD

CONCLUSION

- There is growing interest in using PD in AKI
- No evidence that PD is inferior to other RRT modalities
- Success depends on diagnosis , selection of patient & team experience
- Using APD , flexible PD catheter to overcome limitations
- The prescription should achieve adequate metabolic and fluid controls
- Kt/v of 0.45 / session is enough
- PD should be stopped after 3 sessions if no adequate fluid and metabolic control
- PD is a successful option to treat AKI especially in developing countries
- There is obvious improvement in AKI patients survival



THANK YOU

**M.ESSAHATY
PRESIDENT OF SRC
HEAD OF PD UNIT BNC**

