

Acute Kidney Injury Saving Young Lives 0 by 25

a new frontier for PD

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Nothing to disclose

The Increasing Frequency of Dialysis-Requiring AKI

Hsu et al JASN 24:37, 2013

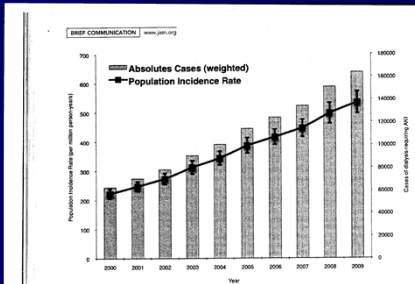


Figure 1. Population incidence of dialysis-requiring AKI in the United States from 2000 to 2009 (absolute count and incidence rate per million person-years). Bars represent 95% CIs for incidence rates. The number of cases of dialysis-requiring AKI increased from 63,000 in 2000 to 173,000 in 2009.

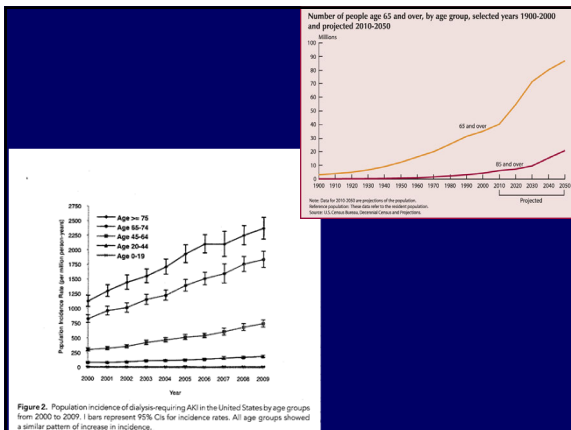
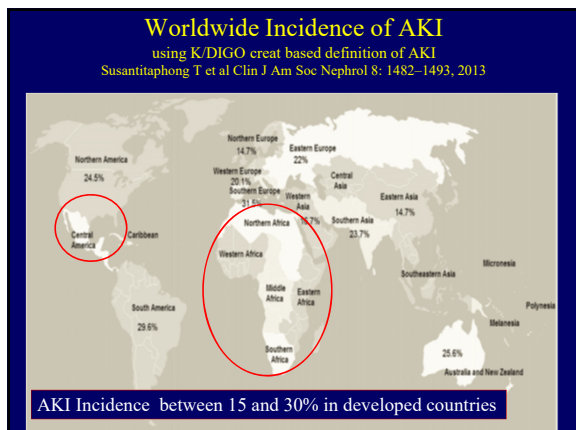



Figure 2. Population incidence of dialysis-requiring AKI in the United States by age group from 2000 to 2009. Bars represent 95% CIs for incidence rates. All age groups showed a similar pattern of increase in incidence.






ISN "0 by 25"

Proposed by Giuseppe Remuzzi
President, ISN, in Hong Kong, 2013

John Feehally
Coordinator of the Project



ISN "0 by 25" Initiative: Goals

Eliminate Preventable Deaths from Acute Kidney Injury (AKI) Worldwide by 2025

- Globally applicable strategies that permit a timely diagnosis of acute kidney injury and provide access to renal replacement therapy for patients with potentially reversible acute kidney diseases.
- Focus on LMIC countries

0 by 25 Recognition and Intervention Study

- Determine barriers for recognition and management of AKI in different settings in resource constrained regions in Africa, Asia and Latin America
- Assess the feasibility of implementing interventions to optimize care of AKI
- Ongoing study: Compare outcomes from AKI with and without interventions

Sites Selected for Intervention Trial

- Malawi
- Bolivia
- Nepal

Introduce point of care laboratory testing, educational programs, telecommunication, timely transfer of care, hydration, avoidance of nephrotoxins, etc

Results of Intervention Trial

- 3577 patients studied (1929 observation phase, 1630 in intervention phase)
- Results– (intervention compared to observation):
 - a) *increased recognition of AKI*
 - b) *more aggressive hydration*
 - c) *reduced hospitalization*
 - d) *lower mortality*

Changes are on the Horizon in Many Low Resource Countries

- The Kenya government has decided to construct dialysis units in each province (n=47)
- An East Africa Renal Institute has been created in Nairobi with funds from the East Africa Development Bank
- The Tanzanian government has decided to pay for dialysis for all government employees
- Projects to manufacture PD solution in Ethiopia, Nigeria and Sudan are under consideration
- Projects to study the incidence of AKI have been done or are ongoing in Uganda, Rwanda, Malawi, Tanzania and elsewhere

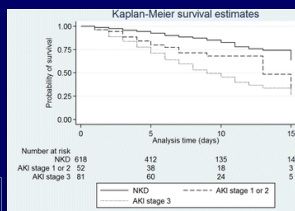
AKI in Malawi

Evans et al BMC Nephrol 2017 8:21

892 Admissions
c. 20% with AKI

Causes of AKI

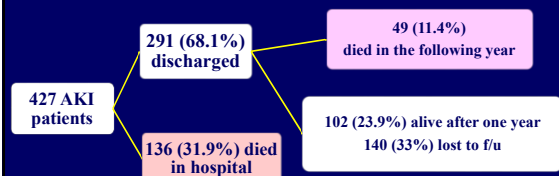
- Infections (gastroenteritis (19%), TB (12%), malaria (8%))
- Dehydration-other- (8%)
- CHF (11%)
- Liver failure (5%)



Outcome of AKI Patients in Rwanda

Grace Igiraneza, Joseph Ntarindwa, Marla McNight ASN 2016, WCN 2017

- Estimated the incidence of AKI in the four referral hospitals in Rwanda using the KDIGO definition of AKI
- Patients with AKI had significantly longer hospital stays than those without AKI (17.4 ± 18.7 vs 7.1 days, p<.001)
- Patients with AKI had significantly higher in hospital mortality rate than those without AKI (32% vs 4% p<.001)



Saving Young Lives Project (2012 to now)

- Originally funded with a 5 year grant from the Kaplan Foundation with the ISN, ISPD, IPNA, and EuroPD supporting educational programs and the Sustainable Kidney Care Foundation (SKCF) providing supplies.
- Now it is supported with funds from the ISN, ISPD, IPNA, and EuroPD which are responsible for supporting educational programs in low resource countries to provide PD for patients with AKI

PD and Acute Kidney Injury

- 20+ years ago, PD was the standard treatment of AKI
- This changed with the introduction of the central venous catheter for hemodialysis and the proliferation of extra-corporeal therapies and devices

HEMOFILTRATION VERSUS PERITONEAL DIALYSIS IN ACUTE RENAL FAILURE

N Engl J Med 2002;347:895-902

HEMOFILTRATION AND PERITONEAL DIALYSIS IN INFECTION-ASSOCIATED ACUTE RENAL FAILURE IN VIETNAM

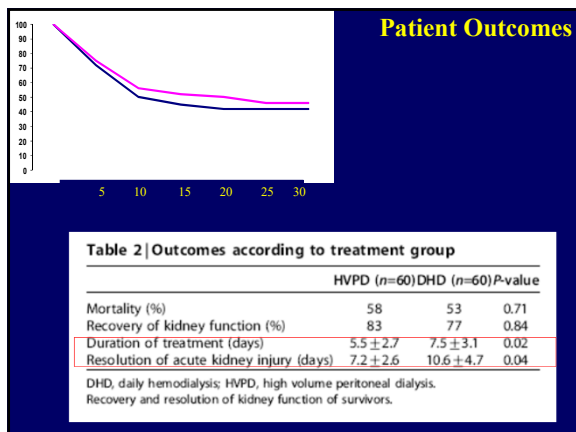
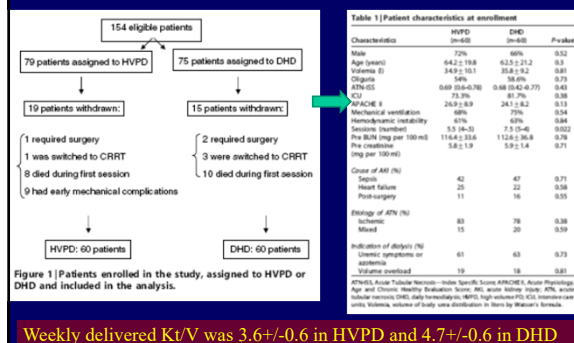
NGUYEN HOAN PHU, M.D., TRAN TRINH HIEN, M.D., NGUYEN THE HOANG MAU, M.D., TRAN THI HONG CHAU, M.D., LY VAN CHONG, M.D., PHAM PHU LOC, M.D., CHRISTOPHER WINGGALLS, D.Phil., M.B., JEREMY FARROW, M.B., D.Phil., NICHOLAS WHITE, M.D., D.Sc., AND NICHOLAS DAY, B.M., B.Ch.

2002

- Prospective and randomized study
- 70 patients (PD= 36; HF= 34)
- Protocol was interrupted: mortality rate 47 vs 15%

Randomized Trial Comparing Mortality Rates with High Volume PD and Daily HD

Gabriel DP, *KI* 2008;72:S87-S93

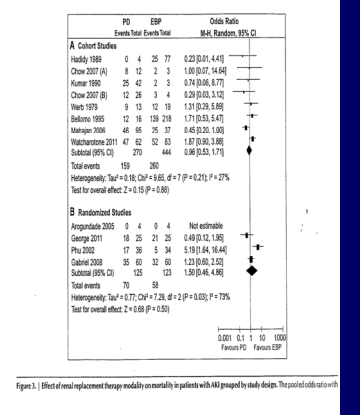


Review of Brazilian Experience of PD for AKI

(Ponce D et al; CJASN 7:887, 2012)

- 204 patients with AKI treated with PD
- 54 patients withdrawn within 24 hours (34 died, 20 early mechanical complications)
- Mean age 64 +/- 16 years
- 70% in the ICU
- Prescribed KT/V of 0.6 per day and delivered KT/V of 0.5/day (3.5 +/- 0.7/week)
- 16-22 exchanges/24 hours (32-44 Liters)
- 57% died and 12% developed peritonitis

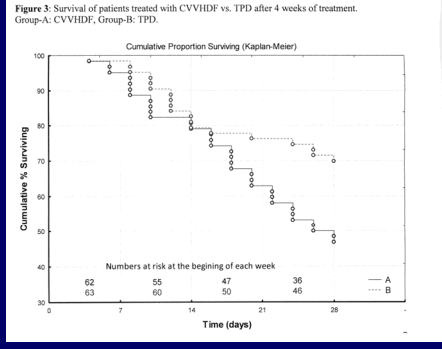
Chionh et al:
 Use of peritoneal dialysis
 in AKI: a systematic
 review
 CJASN 8:1649, 2013



Randomized Trial from Saudi Arabia

Abdullah Al-Hwiesh, Ther Apher Dial. 2018, in press

- Compared acute PD with CVVH-D in critically ill patients in Dammam, Saudi Arabia
- Better survival and shorter duration of dialysis in those patients treated with PD
- 75 patients in each group



Acute peritoneal dialysis: what is the 'adequate' dose for acute kidney injury?

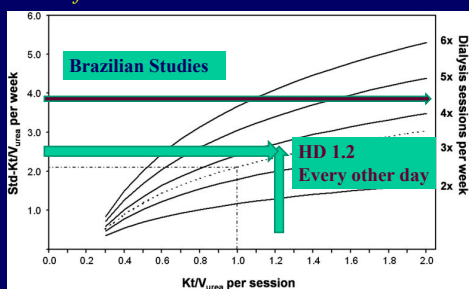
Chionh CY, Ronco C, Finkelstein FO, Soni I SS, Cruz DN NDT 2010 25: 3155

- No data exist on the optimal dose of PD for AKI treatment
- Although the data to support this target are limited, it might be reasonable to suggest a minimum weekly std-Kt/Vurea of 2.1
- A higher clearance should be considered if the patient is markedly catabolic.
- In addition, attention needs to be paid to achieving adequate volume control and middle-molecule clearances.

What About the Dose of PD That Provides An Acceptable Level of Care?

Chionh et al NDT 2010 25: 3155

Conversion from Intermittent HD to a Standardized KT/V



Randomized Trial from Thailand

Parapiboon et al PDI 2017

- 92 patients randomized to high dose (36 L/day) vs low dose (18 L/day) PD for initial 2 days of therapy
- 75 patients analyzed
- Prescribed Kt/V of 4.3 vs 2.7, but delivered of 3.5 and 2.1
- No difference in outcomes

ISPD Guideline: Peritoneal Dialysis for Acute Kidney Injury, Perit Dial Int 34:494-517, 2014

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Adult and Pediatric Guidelines

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- 1. Peritoneal dialysis should be considered as a suitable method of renal replacement therapy in patients with acute kidney injury [1B]
- 2. Flexible, tunneled PD catheters are preferred
- 3. There is no "ideal" method of catheter insertion
- 4. Dose of PD should be targeted for a weekly KT/V of 2.1–higher if the patient is very catabolic

Peritoneal Dialysis Solutions for Acute PD

3.4 Commercially prepared solutions should be used [1C] (Optimal). However where resources do not permit this, then locally prepared fluids may be lifesaving.[2D] There is a high potential risk of contamination when preparing fluid and every effort should be made for this to be performed by pharmacists in a sterile environment not at the bedside. [1D] (Minimum Standard)

Sites That Have Developed (n=16)

- Tanzania (Moshi n=26)
- Cameroon (Mbongo n=68)
- Benin (Cotonou n=34)
- Ghana (Kumasi n=116)
- Ghana (Accra n=8)
- Cambodia (Phnom Penh n=3+)
- The Dem Rep of the Congo (Goma n=3+)
- Ivory Coast (Abidjan n=24)
- Tanzania (Dar) n=?100
- Tanzania (Mwanza ?)
- Ethiopia (Addis: n=12)
- Uganda (Kampala n=1)
- Malawi (Blantyre n=12)
- Nigeria (Lagos n=??)
- Nigeria (Owo, Ondo State n=6+)
- Dem Rep of the Congo (Kinshasa n=??)

Overall Results

- Well over 600 patients with AKI treated with acute PD
- Mortality rate in hospital: 25%
- Mean age 10.1 years (range 1 to 60)
- Mean creatinine at start of dialysis 11.3 mg %
- Mean duration of dialysis: 12.8 days
- 84% used single cuff catheters; 16% double cuffed– all placed by nephrologists (except Cameroon)
- About 85% of patients used commercially prepared solutions

Table 1. Comparison of outcomes with commercially and locally made dialysate in Mbongo Cameroon *Dennis Palmer et al PDI 2018*

	Commercial sol'n (N= 25)	Locally made sol'n (N= 43)
Peritonitis	4 (16%)	7 (16%)
Survived	18 (72%)	29 (67%)
Died	7 (28%)	14 (33%)



Local Preparation of Solutions

Type of fluid	Na	K	Ca	Mg	Cl-	HCO ₃	lactate	pH	osm.
Hartmann's	131	5	2.0		111		29	7.0	278
Ringer's lactate	131	5	1.8		112		28	6.5	279
Plasmalyte B	130	4	0	1.5	110	27		7.4	273
½ Normal saline	77				77			5.0	154

Advantages of PD	Problems with HD
<ul style="list-style-type: none"> • Avoid problems of hypotension and complications associated with drops in BP • It provides a continuous therapy • Metabolic, volume control can be finely tuned 	<ul style="list-style-type: none"> • Central venous catheters • Blood exposed to plastic for 12+ hours/week • Dialysis hypotension <ul style="list-style-type: none"> --Myocardial stunning --Endotoxemia -- CNS injury

Why Is PD Not Used More Often in High Resource Countries?

Barriers	Solutions
<ul style="list-style-type: none"> • Perception that is not as good as HD or CVVH • Challenges of catheter placement • Nursing issues • Risk of peritonitis • Metabolic control • Concern that is may not work well 	<ul style="list-style-type: none"> • Not true • Easy to do; we have trained large #s of non-nephrologists • Cyclers can be used • Low with good protocols • Can use high volume PD with cycler therapy • The major problem perhaps: but very low risk in patients without abdominal problems or surgery

PD In India

George et al PDI 36:655, 2016

- 245 consecutive adult pts undergoing bedside percutaneous cuffed PD catheter insertion by nephrologists in Vellore, India
- Seldinger technique with dilator and peel-away sheath
- Poor catheter function in about 10%

Impact of 0 by 25 and Saving Young Lives

- Increased awareness of the importance of AKI
- Increased awareness of kidney disease in general– not just AKI
- Expansion of nephrology services for AKI, CKD, and ESRD globally
- Expanded training programs for doctors, nurses, and technicians
- Expanded educational programs
- Reevaluation of the role of PD in managing patients with AKI
