Enzymatic Creatinine

BIDDING FAREWELL TO JAFFE

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Serum creatinine

- Breakdown product of creatine phosphate in muscle
- Produced at a constant rate by the body
- Not much secretion or reabsorption occurs in the tubules
- Raised serum creatinine is indicative of impaired filtration
- Used for screening and monitoring renal function
Urine creatinine

- Creatinine clearance test (24 hr urine): a closer approximation of GFR than serum creatinine
- Urine albumin/creatinine ratio (ACR): used as an early indication of diabetic nephropathy
- Urine protein/creatinine ratio (PCR): useful screening test for renal disease, used during pregnancy
- Drug testing – used to check sample has not been adulterated
**Old method: Jaffe reaction**

- Oldest clinical methodology still in use - described in 1886
- Limitations: non-specific
- Interferences: ascorbic acid, cephalosporins, glucose, guanidine, ketone bodies, protein, pyruvate
- Still popular due to simplicity and low cost
Problems with our Jaffe method

- QC drifting low when kit was down to 350-400 tests (1500 per kit)
- Seemed to be an air to reagent surface area issue
- Absorption of CO2 causes a pH change

We:
- unloaded and mixed kits with 400-800 tests left in the morning
- discarded kits with <400 tests
- calibrated twice a day
Jaffe creatinine QC
New method: enzymatic

- Development started in the 1970s
- Widely accepted as one of the most accurate routine methods available at present
- Roche method uses 3 enzymes
Work up

- Used IT3000 to make a rule- enzymatic creatinine run with every Jaffe
- n= 376
- Range: 26 to 1380
- Compared with Canterbury Health Laboratories (Abbott Jaffe) (n= 55)
- Collected icteric samples, haemolysed samples, and neonatal samples
Regression analysis - serum

Scatter Plot with Passing & Bablok Fit

Identity

Passing & Bablok (I) fit

\(0.26 + 0.99x\)
Regression analysis - urine

Scatter Plot with Passing & Bablok Fit - Urine Creatinine

Identity

Passing & Bablok (I) fit
(-0.06 + 1.02x)
Enzymatic vs CHL

Scatter Plot with Passing & Bablok Fit

- Identity
- Passing & Bablok (I) fit
  (-11.05 + 1.01x)
Internal QC
External QC - RCPA
Conclusion

- Changed to the new method 10 July 2017
- Did not put out any communication to referrers
- Better precision (CV <4%)
- Negative bias for samples with bilirubin >300
- Internal and external QC is now great
- Cost: negligible difference
References