

UK Living Kidney Donation Network Meeting

Clinical Session: Case 2

Dr Ioan PRATA

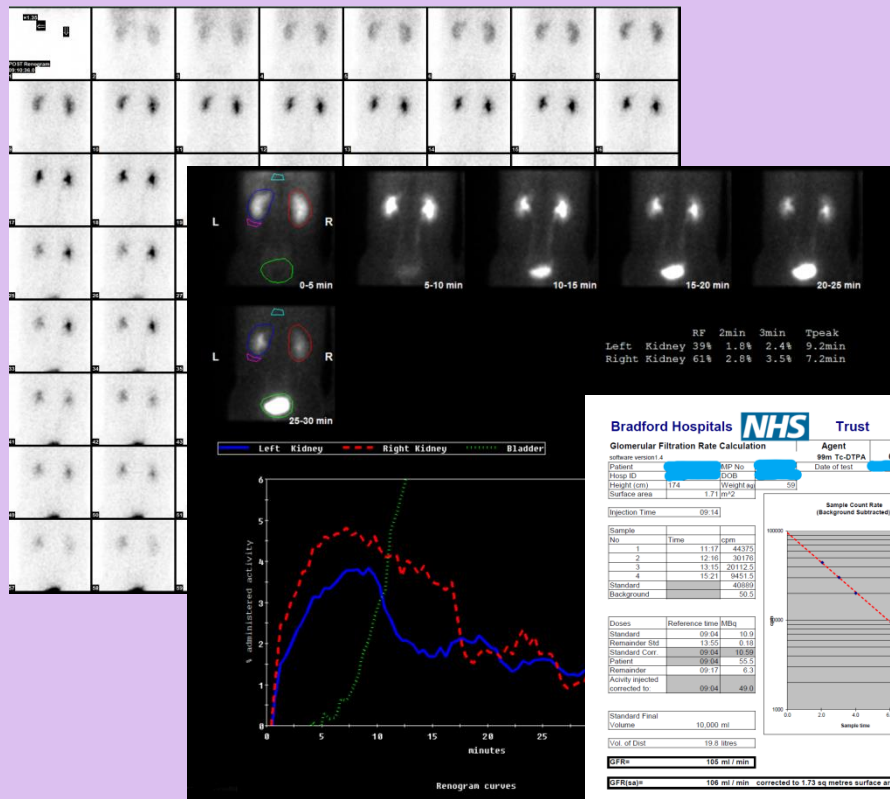
Consultant Nuclear Medicine Physician



Case 2 - 32 y.o. male, potential donor

Tc-99m DTPA RENOGRAM + GFR

Tc-99m DMSA SCINTIGRAPHY



Bradford Hospitals NHS Trust

Glomerular Filtration Rate Calculation

Parameter	Value	Unit
Agent	99m Tc-DTPA	
Half life	6.02	Hours
software version	L4	
Patient Name	[REDACTED]	
DOB	[REDACTED]	
Height (cm)	174	
Weight (kg)	58	
Surface area	1.71	m ²
Injection Time	09:11	

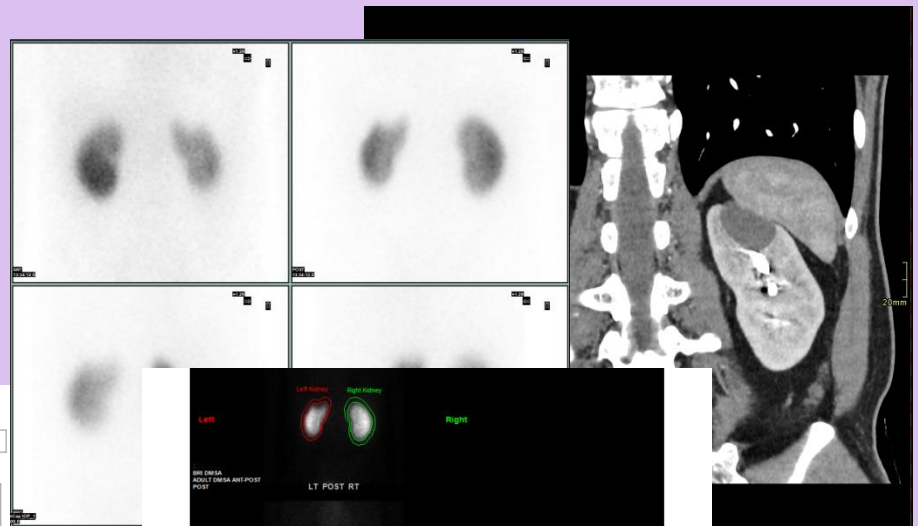
Sample No.	Time	cpm
1	11:17	43375
2	12:10	30170
3	13:15	20124.5
4	15:21	14613.5
Standard		40889
Background		50.5

Doses	Reference time (MBq)
Standard	09:04 10.9
Remainder 50g	13:55 0.10
Standard Corr	09:04 10.99
Patient	09:09 50.5
Remainder	09:11 6.3
Activity injected corrected to	09:04 43.0

Parameter	Value
Standard Final Volume	10,000 ml
Vol. of Dist	19.8 litres
GFR	158 ml/min

CRF (ml/min) = 158 ml/min - corrected to 1.73 sq metres surface area

GFR normalised to 1.73 m² is typically between 70 and 160 ml/min for a healthy young adult falling to 30 to 70 ml/min for an 80 year old



Renal DMSA Uptake

View	Left Kidney (%)	Right Kidney (%)
LT POST RT	39.22%	60.78%
RT ANT LT	47.14%	52.86%

Parameter	Value
Age (years)	32
Kidney Counts	94135 (Left), 89987 (Right)
Kidney Area (pixels)	894 (Left), 886 (Right)
Bkgd Counts	10388 (Left), 9046 (Right)
Bkgd Area (pixels)	773 (Left), 800 (Right)

Tc-99m DTPA

Bradford Hospitals **NHS** Trust

Glomerular Filtration Rate Calculation

software version 1.4

Patient	[REDACTED]	MP No	[REDACTED]
Hosp ID	[REDACTED]	DOB	[REDACTED]
Height (cm)	174	Weight (kg)	59
Surface area	1.71	m ²	

Agent	half life
99m Tc-DTPA	6.02 Hours
Date of test	[REDACTED]

Injection Time 09:14

Sample No	Time	cpm
1	11:17	44375
2	12:16	30176
3	13:15	20112.5
4	15:21	9451.5
Standard		40889
Background		50.5

Doses	Reference time	MBq
Standard	09:04	10.9
Remainder Std	13:55	0.18
Standard Corr.	09:04	10.59
Patient	09:04	55.5
Remainder	09:17	6.3
Activity injected corrected to:	09:04	49.0

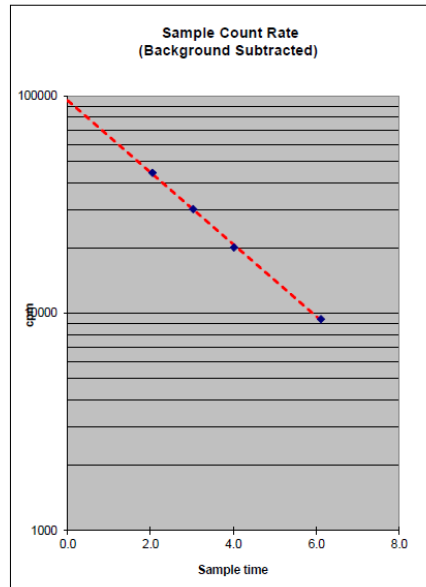
Standard Final Volume 10,000 ml

Vol. of Dist 19.8 litres

GFR= 105 ml / min

GFR(sa)= 106 ml / min corrected to 1.73 sq metres surface area

GFR normalised to 1.73 m² is typically between 70 and 160 ml/min for a healthy young adult falling to 30 to 70 ml/min for an 80 year old



- Glomerular filtration
- Allows GFR measurement
- Low protein binding (insignificantly underestimates GFR)
- Extraction fraction 20% (images not clear, not useful in impaired renal function)

GFR(sa) – 106 ml/min/1.73m²

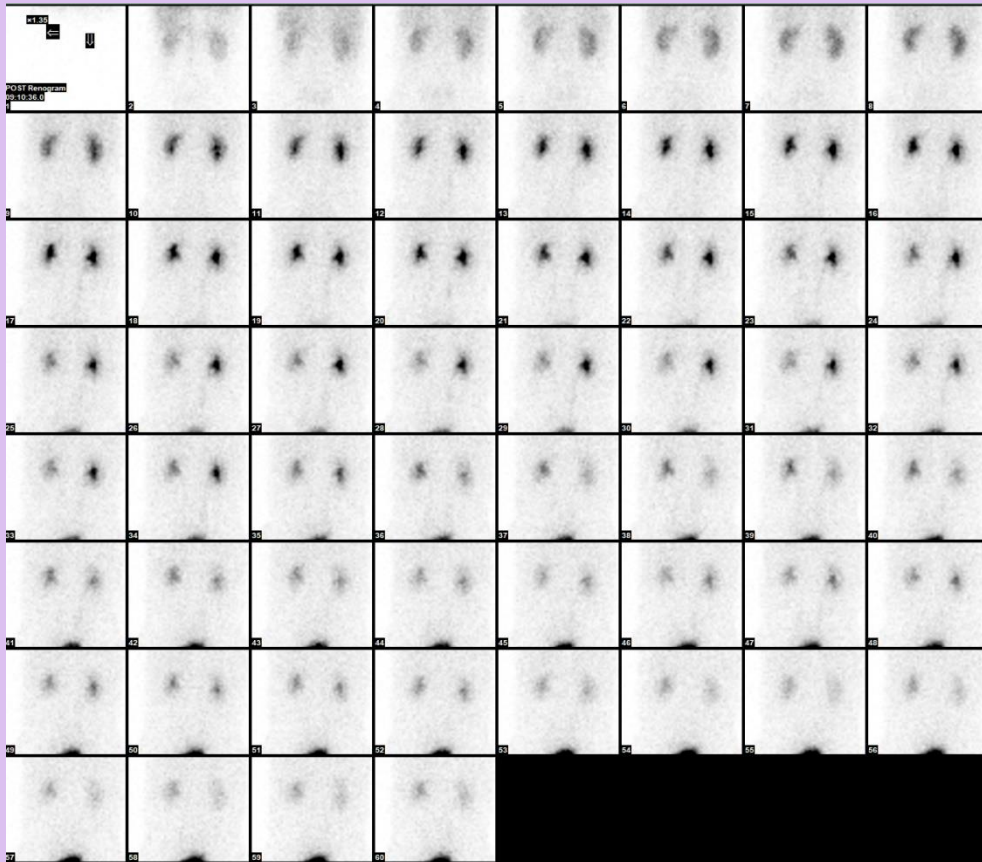
Split function - 39% left
- 61% right

Tc-99m DTPA

- Glomerular filtration
- Allows GFR measurement
- Low protein binding
(insignificantly underestimates GFR)
- Extraction fraction 20%
(images not clear, not useful in impaired renal function)

GFR(sa) – 106
ml/min/1.73m²

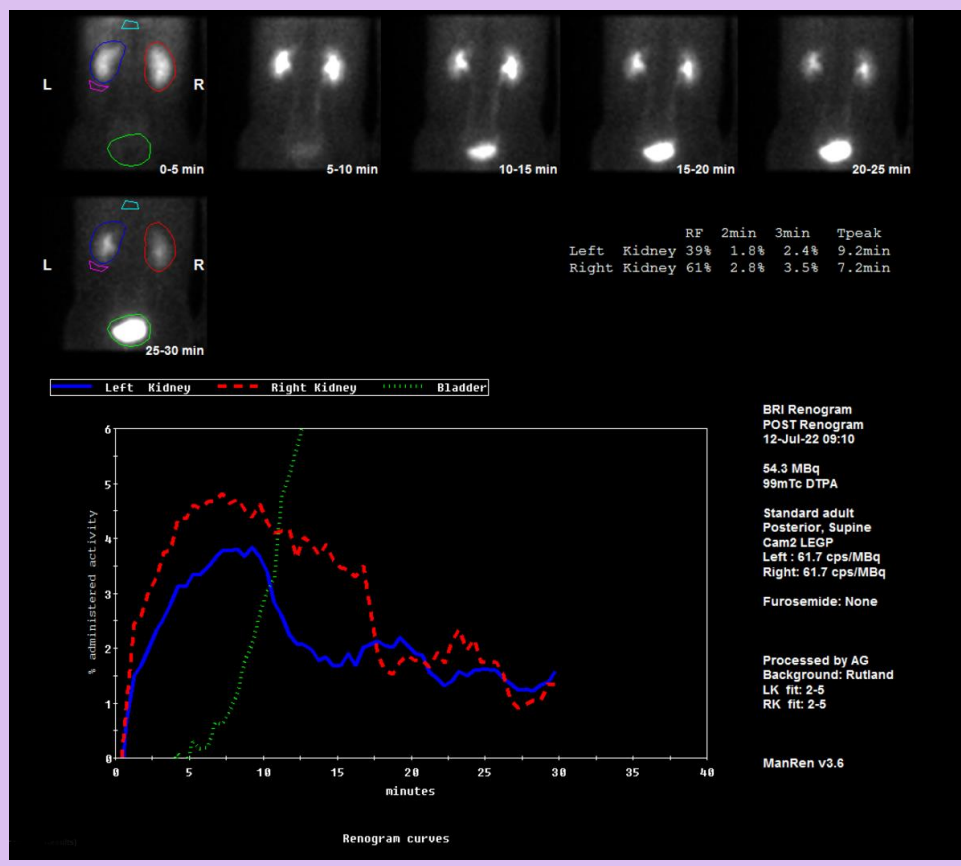
Split function - 39% left
- 61% right



*Image 2 – Dynamic images DTPA renogram

Tc-99m DTPA

- Glomerular filtration
- Allows GFR measurement
- Low protein binding (insignificantly underestimates GFR)
- Extraction fraction 20% (images not clear, not useful in impaired renal function)



GFR(sa) – 106
 ml/min/1.73m²

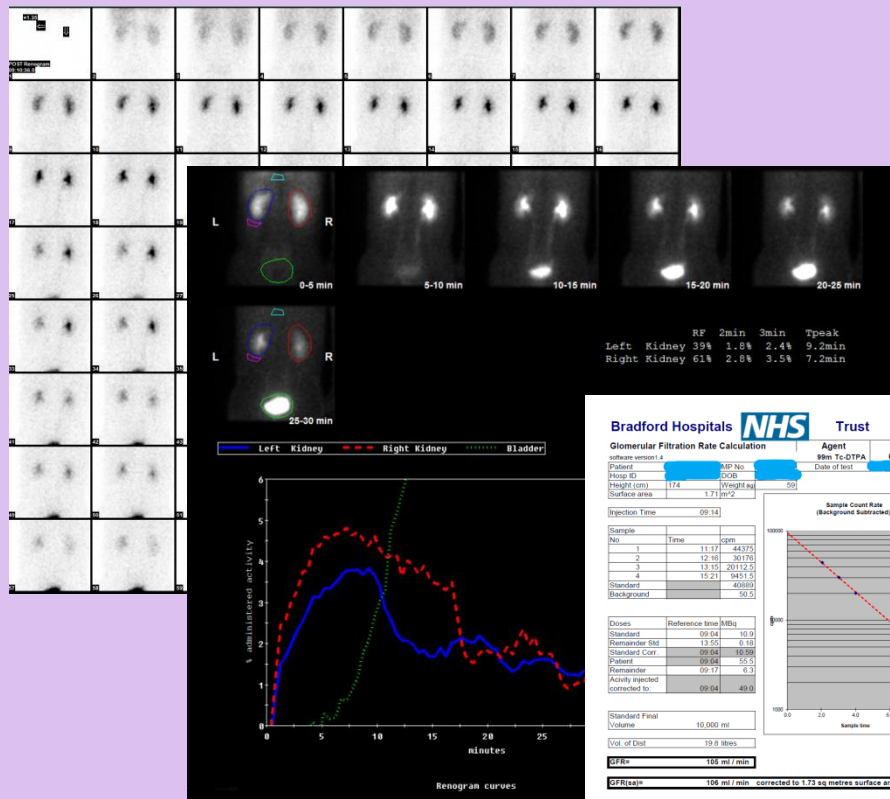
Split function - 39% left
 - 61% right

*Image 3 – DTPA renogram processing results

Case 2 - 32 y.o. male, potential donor

Tc-99m DTPA RENOGRAM + GFR

Tc-99m DMSA SCINTIGRAPHY



Bradford Hospitals NHS Trust

Glomerular Filtration Rate Calculation

Agent	half life
99m Tc-DTPA	6.02 Hours

software version: 4.1

Patient: [redacted] 32 y.o. male

Height (cm): 174 Weight (kg): 88

Surface area: 1.71 m²

Injection Time: 09:11

Sample No.	Time	cpm
1	11:17	43375
2	12:10	30170
3	13:15	20124.5
4	15:21	14615.5
Standard		40889
Background		50.5

Sample Count Rate (Background Subtracted)

Doses: Reference time (MBq) 10.9

Standard: 09:04 10.9

Remainder: 09:12 0.10

Standard Corr: 09:04 10.99

Patient: 09:09 50.5

Remainder: 09:12 0.3

Activity injected corrected to: 09:04 43.0

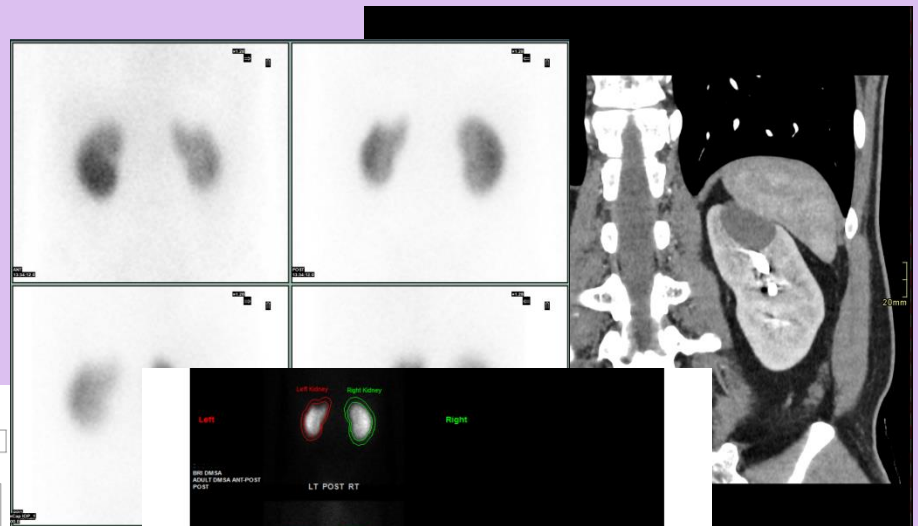
Standard Final Volume: 10.000 ml

Vol. of Dist: 19.8 litres

GFR: 108 ml/min

CR (eGFR): 108 ml/min - corrected to 1.73 sq metres surface area

GFR normalised to 1.73 m² is typically between 70 and 160 ml/min for a healthy young adult falling to 30 to 70 ml/min for an 80 year old



Renal DMSA Uptake

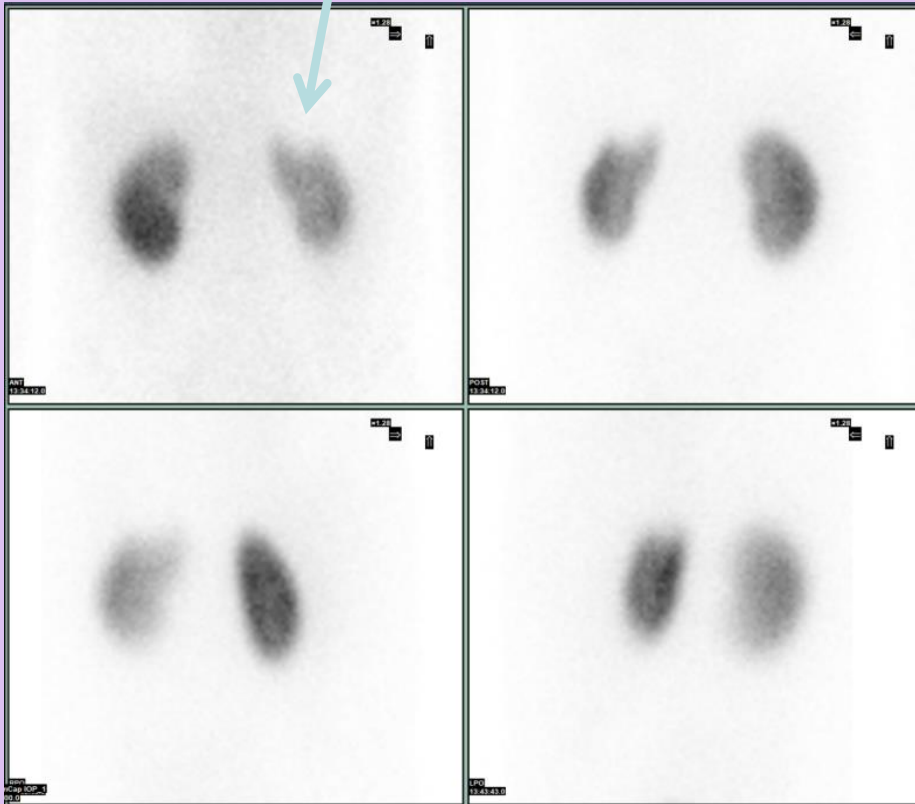
Parameter	LEFT	RIGHT
% Total Relative Uptake:	39.22 %	60.78 %
% Total Area:	47.14 %	52.86 %

Radiopharmaceutical: DMSA (Tc-99m)

Age (years): 32

Region	Pre	Post	Post	Anti
Kidney Counts:	94135	89987	129663	99273
Kidney Area (pixels):	894	896	601	899
Bkgd Counts:	10388	9046	13399	11246
Bkgd Area (pixels):	771	800	925	914

Tc-99m DMSA

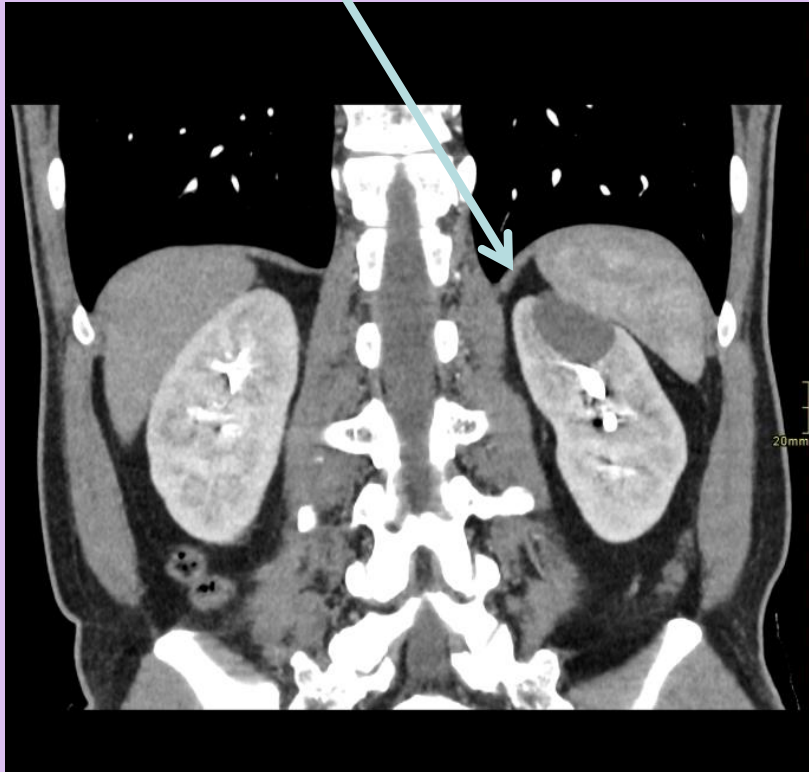


- Cortical binding agent
- Reliable split function calculation
- Not operator dependent
- Better target to background contrast
- Assesses function rather than anatomy

Split function - 39.2% left
- 60.8% right

***Image 4** – planar images DMSA: anterior, posterior and oblique.
Arrow - cortical defect in superior left kidney

Tc-99m DMSA



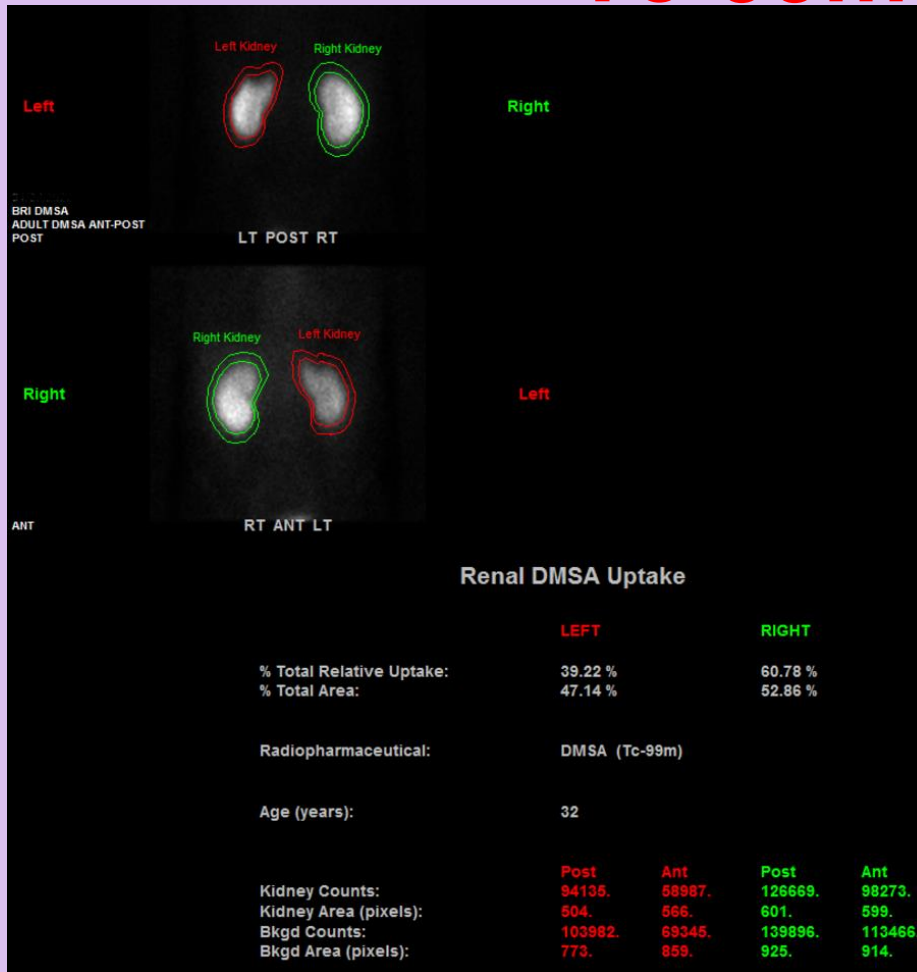
- Cortical binding agent
- Reliable split function calculation
- Not operator dependent
- Better target to background contrast
- Assesses function rather than anatomy

Split function - 39.2% left
- 60.8% right

***Image 5** – Contrast CT .

Arrow – 37 mm hypodense lesion corresponding to the cortical defect on DMSA

Tc-99m DMSA



- Cortical binding agent
- Reliable split function calculation
- Not operator dependent
- Better target to background contrast
- Assesses function rather than anatomy

Split function - 39.2% left
- 60.8% right