

## **SECTION M SCOTTISH RENAL BIOPSY REGISTRY: SURVEY OF TRANSPLANT KIDNEY BIOPSY IN SCOTLAND 2015**

All renal units in Scotland were able to provide date of procedure, date of birth, sex, and main diagnosis for all transplant renal biopsies performed in the calendar year 2015. Biopsy diagnosis was selected from a bespoke codeset agreed by the SRR Biopsy Steering Group (see M3 below). Where possible, renal units also provided indication for biopsy, operator and major complications all selected from pre-defined terms. Biopsies at the time of transplant ('implantation biopsies', 'time zero biopsies') were not included.

The total number of reported transplant biopsies was 355 in 254 patients giving an incidence of 70.6 transplant biopsies per million population (pmp) per year or 0.14 biopsies per prevalent transplant recipient using the Scottish Renal Registry reported prevalent transplant patient data from 31 December 2014.

Total number of biopsies and total number of patients having transplant renal biopsy in each renal unit were expressed pmp and per prevalent transplant patient and for each renal unit based on the populations shown in M1.

Some renal units perform no transplant biopsies or only a proportion of the transplant biopsies for patients from their NHS Board area with the others being performed at the relevant transplant renal unit. For this reason all analyses include a comparison of the NHS Board areas served by the Glasgow (West) transplant unit (A&A, D&G, GG&C, FV, LAN) and Edinburgh (East) transplant unit (GRAM, SHET, ORKN, TAY, HIGH, WI, LOTH, BORD, FIFE).

<b>M1 Number of transplant biopsies in each renal unit 2015</b>								
<b>Renal unit</b>	<b>Health boards</b>	<b>Population 2015</b>	<b>Prevalent transplant patients 31/12/2014</b>	<b>Total transplant biopsies 2015</b>	<b>Total number patients having biopsy</b>	<b>Transplant biopsies pmp/year</b>	<b>Patients having transplant biopsies pmp/year</b>	<b>Transplant biopsies per prevalent transplant patient/yr</b>
<b>ARI</b>	GRAM + SHET + ORKN	632690	274	41	24	64.8	37.9	0.15
<b>XH</b>	A&A	370590	129	3	3	8.1	8.1	0.02
<b>DGRI*</b>	D&G	149670	67	0	0	0.0	0.0	0.00
<b>GLAS</b>	GG&C + FV	1452540	1016	116	93	79.9	64.0	0.11
<b>MONK*</b>	LAN	654490	207	0	0	0.0	0.0	0.00
<b>NINE</b>	TAY	415040	214	16	12	38.6	28.9	0.07
<b>RAIG</b>	HIGH + WI	348070	139	14	11	40.2	31.6	0.10
<b>RIE</b>	LOTH + BORD	981830	468	149	105	151.8	106.9	0.32
<b>VHK</b>	FIFE	368080	119	16	12	43.5	32.6	0.13
<b>East</b>		2397640	1075	222	153	92.6	63.8	0.21
<b>West</b>		2627290	1419	119	96	45.3	36.5	0.08
<b>Scotland</b>		<b>5024930</b>	<b>2494</b>	<b>355</b>	<b>254</b>	<b>70.6</b>	<b>50.5</b>	<b>0.14</b>

\* All transplant kidney biopsies for DGRI and MONK are performed at GLAS.

## Indication for transplant biopsy

<b>M2 Indication for transplant kidney biopsy 2015</b>								
<b>Centre</b>	<b>AKI</b>	<b>Chronically deteriorating transplant function and proteinuria</b>	<b>Chronically deteriorating transplant function only</b>	<b>Nephrotic Syndrome</b>	<b>Preserved transplant function and proteinuria</b>	<b>Protocol biopsy</b>	<b>Other (specify)</b>	<b>Not specified</b>
<b>ARI</b>	15	5	4	1	0	1	15	0
<b>XH</b>	1	0	2	0	0	0	0	0
<b>DGRI</b>	0	0	0	0	0	0	0	0
<b>GLAS</b>	46	15	26	1	1	0	27	0
<b>MONK</b>	0	0	0	0	0	0	0	0
<b>NINE</b>	13	2	1	0	0	0	0	0
<b>RAIG</b>	6	1	3	0	0	2	2	0
<b>RIE</b>	0	1	1	0	0	5	6	136
<b>VHK</b>	6	0	7	0	0	1	2	0
<b>East</b>	40	9	16	1	0	9	25	136
<b>West</b>	47	15	28	1	1	0	27	0
<b>Scotland</b>	<b>87</b>	<b>24</b>	<b>44</b>	<b>2</b>	<b>1</b>	<b>9</b>	<b>52</b>	<b>136</b>

## Histopathological diagnosis.

Nephrologists were asked to select the diagnosis that was the main explanation for the clinicopathological features. The reported diagnoses are shown in M3.

M3 Histopathological diagnosis												
	ARI	XH	DGRI	GLAS	MONK	NINE	RAIG	RIE	VHK	East	West	Scotland
Acute tubulodegenerative change (ATN)	3	0	0	27	0	0	0	31	0	34	27	61
Rejection: ACR (1A)	3	0	0	8	0	0	2	0	0	5	8	13
Rejection: ACR (1B)	0	0	0	10	0	0	0	1	0	1	10	11
Rejection: ACR (2A, 2B, 3)	1	0	0	14	0	0	0	1	0	2	14	16
Rejection: ACR (NOS)	0	0	0	0	0	0	0	14	0	14	0	14
Rejection: acute / active ABMR	1	0	0	2	0	0	0	5	0	6	2	8
Rejection: borderline	7	0	0	3	0	0	1	7	2	17	3	20
Rejection: chronic ABMR	1	1	0	6	0	0	1	1	0	3	7	10
Rejection: chronic allograft arteriopathy	0	0	0	0	0	0	0	1	0	1	0	1
Rejection: chronic, active ABMR	0	1	0	8	0	0	0	4	0	4	9	13
Rejection: mixed ABMR & ACR	1	0	0	0	0	2	1	6	1	11	0	11
Rejection - other	0	0	0	0	0	5	0	0	0	5	0	5
BKVAN	2	0	0	3	0	0	0	8	4	14	3	17
CNI toxicity	6	0	0	1	0	0	0	4	0	10	1	11
Donor disease	0	0	0	1	0	2	1	6	0	9	1	10
IFTA	5	0	0	7	0	1	1	20	2	29	7	36
iIFTA	2	0	0	2	0	0	0	0	0	2	2	4
Infection (other than BKVAN)	1	0	0	0	0	0	0	2	0	3	0	3
Insufficient Tissue for Diagnosis	0	0	0	0	0	2	0	1	1	4	0	4
No significant histopathological abnormality	3	0	0	6	0	2	3	25	3	36	6	42
Not stated	2	0	0	1	0	0	2	0	0	4	1	5
Other	3	1	0	12	0	1	2	5	1	12	13	25
Recurrent disease	0	0	0	5	0	1	0	4	2	7	5	12

ACR = acute cellular rejection, 1A, 1B, 2A, 2B, 3 refer to Banff classification

ABMR = antibody mediated rejection

BKVAN = BK virus associated nephropathy

CNI = calcineurin inhibitor

IFTA = interstitial fibrosis and tubular atrophy

iIFTA = inflammatory interstitial fibrosis and tubular atrophy

## Time since transplant

The time between receipt of the kidney transplant being investigated by biopsy and the date the biopsy was performed is summarised in M4.

<b>M4 Time between receipt of kidney transplant and biopsy date</b>							
Renal unit	1-28 days	1-3 months	3-12 months	1-5 years	5-10 years	>10 years	Not stated
ARI	5	10	5	15	1	5	0
XH	0	0	0	1	1	1	0
DGRI	0	0	0	0	0	0	0
GLAS	20	12	25	30	9	20	0
MONK	0	0	0	0	0	0	0
NINE	2	4	4	3	0	3	0
RAIG	0	0	4	4	4	2	0
RIE	54	16	30	33	11	4	1
VHK	0	1	4	9	1	1	0
East	61	31	47	64	17	15	1
West	20	12	25	31	10	21	0
Scotland	81	43	72	95	27	36	1

<b>M5 Clinician who performed the transplant biopsies in each renal unit 2015</b>					
Renal unit	Radiologist	Consultant nephrologist	Nephrology trainee	Transplant surgeon	Not stated
ARI	0	35	5	0	1
XH	2	0	1	0	0
DGRI	0	0	0	0	0
GLAS	1	1	109	2	3
MONK	0	0	0	0	0
NINE	1	14	1	0	0
RAIG	4	10	0	0	0
RIE	149	0	0	0	0
VHK	0	16	0	0	0
Scotland	157	76	116	2	4

## Major complications

Complications were categorised as shown in M6. There were 5 major complications (1.4%) with no loss of transplant kidney or death.

<b>M6 Major complications</b>	
<b>Complication</b>	<b>Number</b>
Arteriography and embolisation	2
Arteriography no embolisation	0
Blood transfusion only	3
Clot obstruction managed conservatively	0
Clot obstruction requiring intervention	0
Death	0
Nephrectomy	0
Other please specify	0
Surgery no nephrectomy	0
<b>Total</b>	<b>5</b>

This is the first analysis of all transplant renal biopsies in Scotland in one year.

Analysing the data by region (East v West) demonstrates a substantially higher incidence of transplant biopsies in the East region (92.1 v 45.5 pmp) despite a higher prevalence of patients with kidney transplants in the West region. This is accounted for mainly by biopsies in patients who have had their transplant for less than five years.

The analysis of indication and histopathological diagnosis suggests a lower clinical threshold for performing transplant biopsy in the East region; the incidence of 'no significant histopathological abnormality' and 'rejection –borderline' are higher in the East but the incidence of definite acute rejection categories is very similar.

There are other potential explanations that merit exploration in future analyses in relation to clinical factors (perceived immunological risk of transplants, combined kidney/pancreas transplantation which is centralised in Edinburgh, follow up biopsies to monitor treatment of rejection and BKVAN) and logistical factors (eg nephrologist versus radiologist performed biopsy procedures).