

Multi-Centre Analysis Of Fracture Risk In Renal Replacement Therapy Patients

V Dey¹, T E Farrah², J P Traynor³, E Spalding¹, S Robertson⁴, C C Geddes²

1. Renal Unit, University Hospital Crosshouse
2. Glasgow Renal and Transplant Unit
3. Monklands District General Hospital, Airdrie
4. Renal Unit, Dumfries and Galloway Royal Infirmary

Introduction

Bone fractures are an important cause of morbidity and mortality in patients on renal replacement therapy (RRT).

Aim

The aim of this multicentre observational study was to quantify the incidence of radiologically proven bone fracture by site, in prevalent RRT groups and study its relationship to associated risk factors.

Methods

A retrospective analysis of patient electronic records was performed from 7 July 2010 to 4 September 2013. All radiology reports from all hospitals across West of Scotland, attached to patients records were obtained. Classification of anatomical fractures sites was pre-defined.

Covariates were identified as potential risk factors for fractures. For calculation of biochemical parameters mean of last three results prior to inception was used. RRT duration was defined as date from first RRT until date of inception.

Results

We identified 2096 patients prevalent on RRT on 7th July 2010. There were 340 fractures in the three-year study period with an overall incidence of 62.8 per 1000 patient years.

The incidences were 37.6, 99.2, and 57.6 per 1000 patient years in the transplant, HD and PD groups respectively ($p < 0.05$). Radial, foot and hip fractures were the 3 commonest sites ($n=53, 47$ and 46 respectively), figure below.

Univariate (not shown) and multivariate Cox proportional hazard models were created (table1).

Incidence of radiological fractures in RRT groups

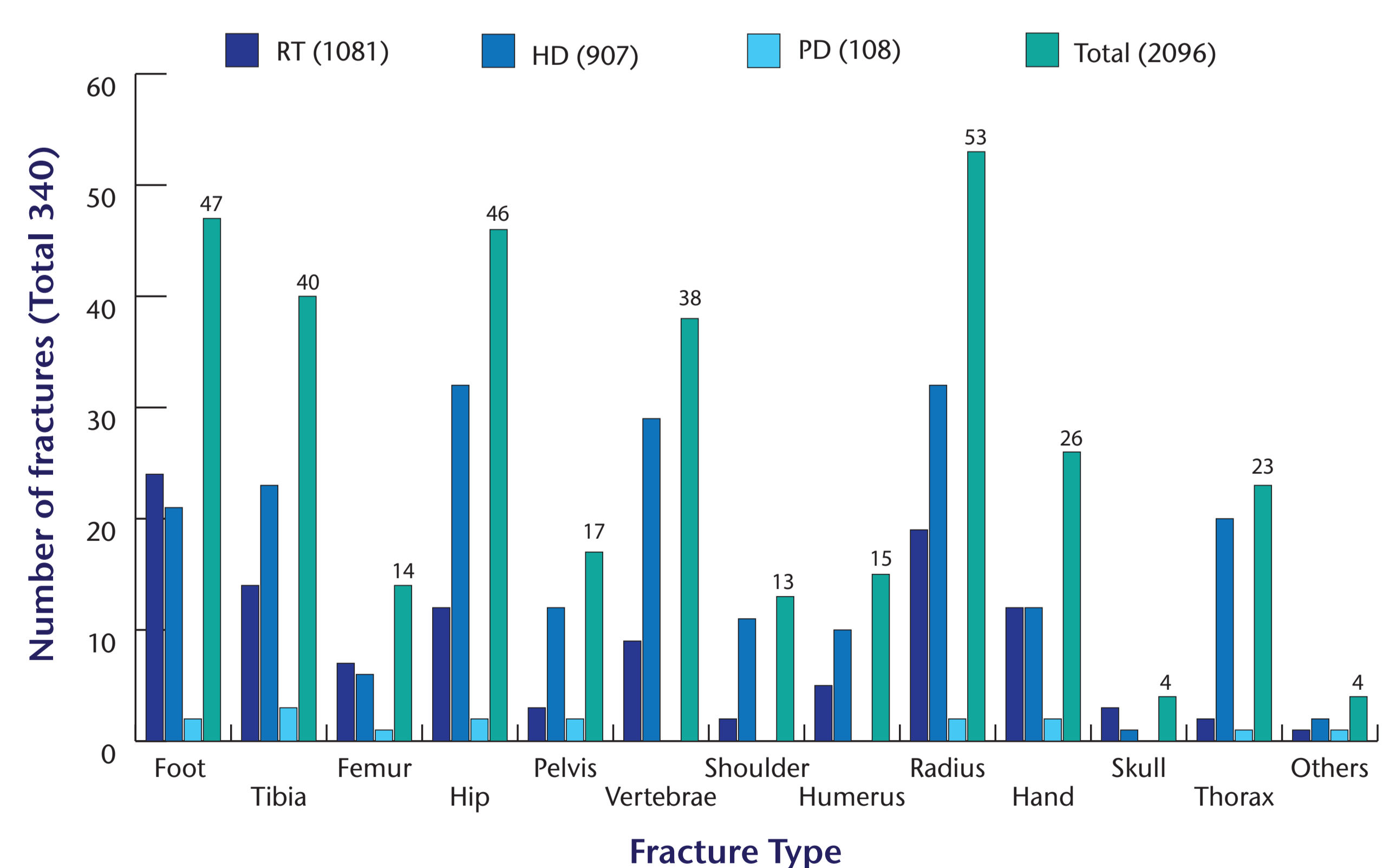


Table 1: Adjusted risk of bone fractures among RRT patients

	Adjusted (All RRT Groups)			p value	Adjusted (HD)			p value
	HR	95.0% CI Lower	Upper		HR	95.0% CI Upper	Lower	
Age (years)	1.02	1.01	1.04	0.002	1.03	1.01	1.04	0.003
Female	1.16	0.80	1.68	0.42	1.10	0.73	1.68	0.64
RRT Modality								
RT	Reference				Reference			
HD	5.25	2.12	12.99	<0.001				
PD	2.64	0.80	8.72	0.11				
RRT Vintage in years								
	1.01	0.98	1.04	0.46	1.01	0.98	1.05	0.53
Primary Renal diagnosis								
Familial/hereditary nephropathy	Reference							
Tubulointerstitial disease	1.28	0.68	2.41	0.45	1.46	0.67	3.14	0.34
Systemic	0.58	0.25	1.32	0.19	0.66	0.26	1.65	0.37
Miscellaneous	0.95	0.50	1.81	0.87	0.96	0.44	2.11	0.92
Glomerular disease	0.42	0.21	0.86	0.017	0.36	0.15	0.88	0.03
Diabetes	1.37	0.70	2.67	0.36	1.38	0.62	3.07	0.43
Blood lab results								
Phosphate (mmol/l)	1.47	0.92	2.35	0.11	1.38	0.81	2.34	0.24
corrected Calcium (mmol/l)	1.76	0.56	5.52	0.33	0.79	0.22	2.79	0.71
Alkaline phosphatase (U/l)	1.00	1.00	1.00	0.10	1.00	1.00	1.00	0.08
corrected albumin (g/l)	0.96	0.93	1.00	0.06	0.95	0.91	1.00	0.04
Parathyroid hormone (pmol/l)	1.00	0.99	1.00	0.30	1.00	0.99	1.01	0.59
Haemoglobin (g/dl)	1.01	1.00	1.02	0.30	1.01	1.00	1.02	0.18
Medication exposure								
Steroid	1.49	0.75	2.96	0.25	1.54	0.72	3.28	0.27
Cinacalcet	0.83	0.43	1.58	0.56	0.80	0.40	1.60	0.52
Alfacalcidol	0.51	0.34	0.76	0.001	0.54	0.34	0.85	0.01
Alucaps	0.91	0.45	1.85	0.79	0.98	0.48	2.03	0.96
CCPB	0.78	0.49	1.23	0.28	0.76	0.47	1.25	0.28
Lanthanum	0.41	0.19	0.88	0.002	0.46	0.21	1.00	0.05
Sevelamer	0.84	0.53	1.32	0.45	0.88	0.54	1.42	0.59

Multivariate model of transplant patients - No significant independent predictors (not shown)

Increased risk of fractures

Decreased risk of fractures

Conclusion

The risk of fracture is higher in HD patients than in transplant patients even when controlling for other risk factors. The apparent protective association with alfacalcidol and lanthanum in HD patients deserves further exploration.

