Autosomal dominant polycystic kidney disease does not in itself appear to cause thrombocytopenia

Stella Setyapranata[1], Stephen G Holt[1,2]

[1]The Royal Melbourne Hospital, Victoria, Australia; [2]Department of Medicine, The University of Melbourne, Victoria, Australia

Background

Small studies have suggested that the platelet counts in patients with autosomal dominant polycystic kidney disease (ADPKD) are lower than general population[1]

Thrombocytopenia may imply enhanced vascular risk due to increased platelet activation and consumption[1].

Aims

- To determine whether patients with ADPKD have lower platelet counts than controls
- To explore the validity and possible cause of this phenomenon

Methods

All living patients in our database (Nephworks 6) with the diagnosis of ADPKD were identified.

They were grouped according to their last known status into chronic kidney disease (CKD), dialysis or transplant groups. Records of any abdominal imaging were then obtained from the hospital database.

A control population without ADPKD but matched for age, sex and last recorded creatinine (except for dialysis group) was obtained from the same database. All blood test results recorded in the database for each individual were included in the data analysis, with each parameter being averaged for each patient prior to obtaining the group mean and expressed ± standard deviation.

Discussion

Although there was a significant difference in platelet count in the dialysis cohort compared to the control group, the difference was small and most likely clinically insignificant. There were no differences in platelet count in the CKD and transplant group.

The higher haemoglobin noted in ADPKD patients on dialysis versus controls is likely due to higher endogenous EPO synthesis in ADPKD[2]. Fewer patients with ADPKD needed an ESA to maintain haemoglobin levels compared with controls.

Other hypotheses for occasionally observed thrombocytopenia includes hypersplenism. 2 patients with splenomegaly appear to have significantly lower platelet count and 1 patient with splenectomy has platelet count around the upper limit of normal. Mild splenomegaly could not be detected without a dedicated imaging.

ADPKD patients on dialysis may have marginally lower platelet counts, but this is unlikely to be clinically significant. We cannot confirm earlier reports of routinely lower platelet counts in patients with ADPKD who have CKD or who have been transplanted.

ADPKD patient who has a significantly low platelet count requires further investigation and explanation of this anomaly, which should include an assessment of spleen size.

References:
1. Bath P, Saggar-Malik A, Macdougall I, Eastwood J, MacGregor G. Increased Platelet Volume in Patients with Adult Polycystic Kidney Disease. Platelets. 1995;6(6):336–9.
2. Verdalles U, Abad S, Vega A, Ruiz Caro C, Ampuero J, Jofre R, et al. Factors related to the absence of anemia in hemodialysis patients. Blood Purif. 2011 Jan;32(1):69–74.

Results

504 patients were identified as having ADPKD. Of these, 192 were deceased and 22 were lost to follow-up thus 290 patients were included in the data analysis. These were divided into 3 groups (CKD: 59 patients; transplant: 171 patients; dialysis: 60 patients). Patients' characteristics and data are summarized in table 1.

Haematology

There were 21,120 individual blood results included in the analysis in the ADPKD group and 21,852 blood tests in the control group.

In the dialysis group, the median number of blood test recorded in the ADPKD group was 52 (range 1-311) and in the control group was 54 (range 1-394). Patients with ADPKD had statistically higher haemoglobin values (114 ± 10 g/L, $p<0.0001$) and lower platelet counts (213 ± 63 x10^9/L, $p<0.01$) than the control group (haemoglobin 105 ± 10 g/L, platelets 238 ± 69 x10^9/L).

In the transplant group, the median number of blood test recorded in the ADPKD group 87 episodes (range 6-312) and in the control group was 82 episodes (range 2-370). There were no significant differences in the measured parameters between the ADPKD and control groups.

In the CKD group, the median number of blood test episodes were 5 (range 1-18) in the ADPKD group and 9 (range 1-91) in the control group. The difference in average platelet counts were not statistically significant in this group.

Splenic Imaging

18 patients from the dialysis group and 3 patients from the CKD group had abdominal imaging (Dialysis: 2 ultrasound, 16 CT abdomen; CKD: 3 CT abdomen). There was no splenomegaly found on this imaging. In the CKD group, there were 12 patients with mildly low platelets (~150x10^9/L) and most of these had no imaging, but there was no splenomegaly noted on the 3 with data.

Within the transplant group, 48 patients had abdominal imaging, but only 2 of the patients were reported to have mildly enlarged spleen or splenomegaly. These 2 patients had platelet average of 115 and 145 x10^9/L respectively. One of the transplant patients had splenectomy and this patient's platelet average was 473 x10^9/L. 31 transplant patients were found to have had a platelets count <100x10^9/L but this was mainly transient likely related to immunosuppression.

Erythropoiesis-stimulating agent (ESA) usage

When we looked at ESA usage in the dialysis group, we found that of the ADPKD patients 29 were on no ESA and 31 were on an ESA with a weekly equivalent erythropoietin (EPO) alpha dose of ~9±9x10^3units (darbopoetin doses were converted to a weekly equivalent of EPO-alpha by multiplying by 240). In comparison, in the control dialysis group only 13 patients were not on ESA, and 47 were on an average equivalent weekly EPO alpha dose of ~11±7x10^3units.

Thus as a group far fewer ADPKD patients were on an ESA and those who were, had on average a slightly (although not significantly) lower dose.

	ADPKD with CKD	CKD Control	ADPKD with transplant	Transplant controls	ADPKD on dialysis	Dialysis Control
N=	59	59	171	171	60	60
Male: Female	29:30	29:30	88 : 83	88 : 83	34:26	34:26
Age (mean± sd)	51.9 ± 16.3	51.8 ± 16.2	60.0 ± 9.8	59.9 ± 9.7	63.6 ± 13.3	63.8 ± 13.2
Haemoglobin (g/L)	129 ± 16	124 ± 18	119 ± 17	119 ± 17	114 ± 10	105 ± 10**
White count (x10^9/L)	7.14 ± 2.07	7.63 ± 2.55	8.11 ± 1.97	8.41 ± 2.11	6.57 ± 2.11	7.82 ± 2.41*
Platelets (x10^9/L)	222 ± 58	245 ± 83	237 ± 56	245 ± 62	213 ± 63	238 ± 69+
Average creatinine (µmol/L)	217 ± 163	205 ± 144	246 ± 132	232 ± 142		
Last creatinine (µmol/L)	247 ± 205	241 ± 194	121 ± 50	122 ± 48		
Dialysis (HD:PD)					56:4	57:3

Table 1. Table of patient demographics and results.
**P<0.0001, *p<0.005, +p<0.05 vs ADPKD on dialysis
ADPKD: autosomal dominant polycystic kidney disease; CKD: chronic kidney disease; HD: haemodialysis; PD: peritoneal dialysis

52 ERA
61--FP
C) Renal development and cystic diseases.
Stella Setyapranata
DOI: 10.3252/pso.eu.52era.2015
ePosters supported by F. Hoffmann- La Roche Ltd.
52nd ERA-EDTA CONGRESS London2015 UNITED KINGDOM MAY 28-31
PosterSessionOnline.com