The Newcastle upon Tyne Hospitals NHS
NHS Foundation Trust

Single-Centre Audit of the Diagnostic Performance of Plasma Metanephrines with Seated Sampling for the Diagnosis of Phaeochromocytoma/Paraganglioma

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INTRODUCTION

Measurement of plasma metanephrines (PMETS) is widely regarded as one of the best screening tests for phaeochromocytoma/paraganglioma (P/PGL). Current Endocrine Society guidelines[1] recommend that samples for PMETS are ideally collected in the supine position after 30 minutes rest and interpreted using supine reference ranges, in order to optimise the diagnostic performance of the test. Current practice in our centre is to collect samples for PMETS from seated patients. The aim of this study was to determine if seated sampling for PMETS provides acceptable diagnostic performance in our centre.

METHODS

Clinical and laboratory data of 113 patients with adrenal histology (or positive paraganglioma histology from any site) over a 4-year period (2010-2014) were gathered and reviewed (Caldicott approval granted by Newcastle Hospitals Clinical Governance). All had undergone preoperative PMETS measurement (LC-MS/MS) and all had post-operative histopathology confirmation or exclusion of P/PGL. The effect on diagnostic performance of using published supine reference ranges[2] in place of in-house seated reference ranges[3] was investigated.

RESULTS

Of the 113 patients included in the study, 40 had a histological diagnosis of P/PGL. Of these 40, 3 were considered clinically and biochemically to be non-secretory. The remaining 73 patients had an alternative adrenal pathology. The diagnostic sensitivity of PMETS (either normetanephrine or metanephrine) above the upper limit of our in-house seated reference range was 93 %. However, excluding 3 cases of PGL determined clinically and biochemically to be non-secretory raised the sensitivity to 100 %. Diagnostic specificity was 91 %. Applying published supine reference ranges[2] made no difference to diagnostic sensitivity in this group of patients, but decreased diagnostic specificity to 77 %.

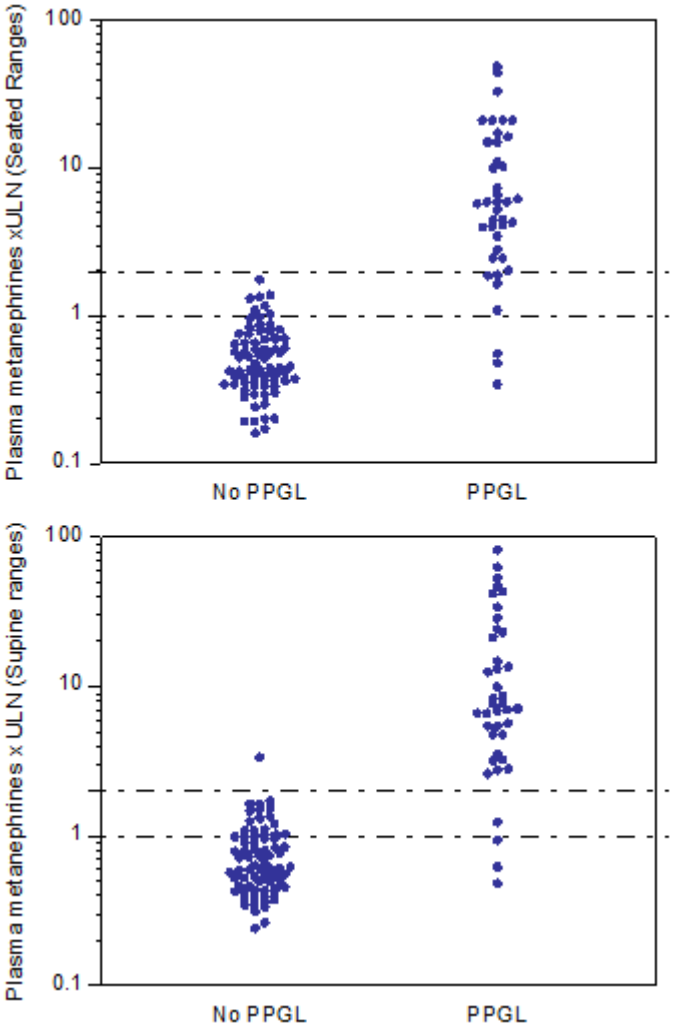

Figure 1. *Plasma metanephrines (normetanephrine or metanephrine, whichever was higher) expressed as multiples of the upper limit of the reference range (seated and supine) for the P/PGL and no P/PGL patient groups.*

Table 1. Characteristics of study population.

	P/PGL (n=40)	No P/PGL (n=73)
Male (%)	17 (43)	41 (56)
Median Age (range)	62 (13-78)	57 (6-80)
Paraganglioma (%)	9 (23)	N/A
Non-P/PGL pathology (%):		
Adrenal cortical adenoma	N/A	29 (40)
Adrenal cortical carcinoma	N/A	11 (15)
Metastasis	N/A	11 (15)
Adrenal hyperplasia	N/A	5 (7)
Other	N/A	17 (23)

'NON-SECRETORY' PARAGANGLIOMAS

The 3 cases of paraganglioma with normal plasma metanephrines were not associated with any symptoms of catecholamine excess. The plasma metanephrines were also within lower supine reference ranges. Urine metanephrines were measured in 2 of the cases and were also in the reference range.

CONCLUSIONS

While these data are derived from a relatively small study population, they demonstrate acceptable diagnostic performance for seated PMETS as a screening test for P/PGL. The data highlight a high diagnostic sensitivity for PMETS with seated sampling in our centre. Adoption of lower reference ranges would appear to offer little gain in diagnostic sensitivity while significantly impairing specificity. Increasing the size of the study population by extending this audit to other centres would help to further define the diagnostic performance of seated PMETS.

1. Lenders JWM et al. JCEM 2014;99:1915-42 **2**. Eisenhofer et al. Ann Clin Biochem 2013;50:62-69 **3**. Peaston et al. Clinica Chimica Acta 2010;411:546-52

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