



PV: Poor Value?



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Introduction

- Hyperviscosity syndromes are caused by increased polyclonal and monoclonal serum immunoglobulins. In 1942 the measurement of plasma viscosity (PV) was recommended to replace erythrocyte sedimentation rate (ESR) as it is not influenced by haematocrit, red blood cell aggregation, haemoglobinopathies, or timing of analysis (Kesmarky, et al., 2008).
- General inflammation and tissue injury can raise the PV, albeit as a surrogate marker, changing more slowly than other inflammatory indicators. PV is a nonspecific marker of inflammation. Its measurement is not dependent on blood flow, but is evaluated by water content and macromolecular components of blood (Kesmarky, et al., 2008).
- The more recent development of C-reactive protein (CRP) assays as a direct marker, has provided superior assessment of inflammation due to increased cytokines. It is a useful marker for monitoring inflammatory conditions.
- No direct comparison studies of PV and CRP could be found on a search of the literature.

Aims and objectives

- To determine if clinicians were concurrently and thus inappropriately requesting both a PV and CRP .

Methods

- Requests for both PV and CRP tests between May and August 2015 (66,487) were assessed.
- Samples were analysed within the Blood Sciences Department of Hull and East Yorkshire Hospitals NHS Trust from both primary and secondary care serving a catchment population of approximately 600,000.
- Data was obtained from the laboratory information management system.

Results

- Results showed primary care was the highest requester of both PV and CRP together 21% (figure 1).
- Secondary care was the highest requesters of CRP only 55%.

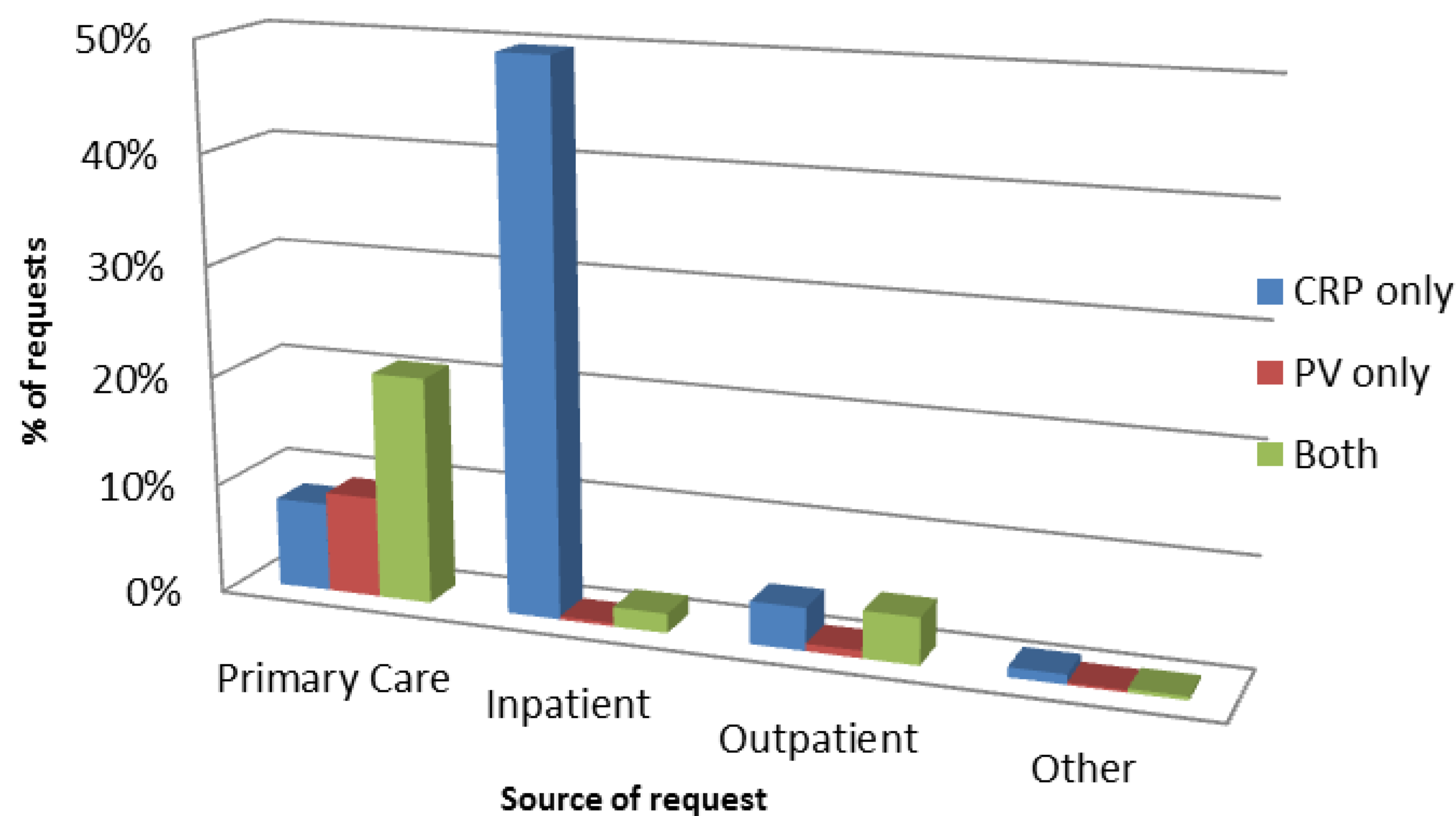


Figure 1. PV and CRP requests within the same day. PV and CRP ordered together 21%, PV only 9% and CRP only 8%.Data from 01.05.15 to 18.08.15.

- Eighty one percent of PV requests from Primary Care were within normal limits with 82% of these having a CRP less than 8mg/L (table 1).
- There was a wide variability in test requesting from individual general practitioners in addition to within and between practices.
- High PV results were not shown to relate to high CRP levels showing variability and inconsistency between the two tests. There was a high positive association between very high/extremely high PV and CRP results (table 2).

Table 1. Percentage of concurrent PV and CRP requests from GP practices and associated results.

PV	Result	CRP	Result
≤1.72m.Pas	81%	≤8mg/L	82%
		>8mg/L	8%
>1.72mPas	19%	≤8mg/L	40%
		>8mg/L	60%

Table 2. Suggested clinical indications (Benson Viscometers Ltd, undated) of raised PV in 19% of subjects from GP requests compared with CRP results.

PV	Clinical indication	% Abnormal Results	CRP	Result
High 1.72 – 2.00mPas	chronic disorders, infection, malignancy, vascular disorders, autoimmune	94%	≤8mg/L	42%
			>8mg/L	58%
Very High 2.01 – 3.00mPas	Multiple myeloma, IgG paraprotein, high concentration asymmetric paraprotein	5.5%	≤8mg/L	9%
			>8mg/L	91%
Extremely High >3.01mPas	Waldenstroms Macroglobulinaemia, Grossly raised IgM paraprotein	0.5%	≤8mg/L	0%
			>8mg/L	100%

Discussion

- Often accepted as such, PV however no longer adds value in clinical diagnosis.
- CRP is accepted as an enhanced inflammatory marker with the use of protein electrophoresis, immunoglobulins, light chain assays and other testing strategies (total protein, albumin gap) more suitable for screening of multiple myeloma. Inflammatory markers are more suitable tool to rule out underlying disease with a need to standardise to the best method available.
- Clinician's ordering inflammatory tests for non-specific purposes adds no clinical value and leads to inappropriate and possibly harmful investigations (Watson, et al., 2012).
- The Carter Review estimated 25% of pathology tests were inappropriate with a wide inconsistency in requesting between general practitioners contributing to massive waste (Fryer & Smellie, 2013).
- Removing the now superseded PV from the screening test repertoire would have a substantial financial impact for our Trust .

Conclusion

- Dual requesting of PV and CRP adds to confusion in interpretation of results.
- Considerable global savings are achievable with the rationalisation of clinical need for appropriate laboratory testing. This combined with demand management of clinically useful tests will allow redeployment of resources within an already overstretched service.

References

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