Calculated globulin - an under-utilised test in identifying immunodeficiency?

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Introduction

Background

Infection is one of the most common causes of hospital admission, accounting for over 1 million admissions per year and 16% of all emergency admissions. Identifying and managing those predisposed to infection, including patients with immunodeficiency, is important to reduce this.

Calculated globulin (total protein minus serum albumin) estimates total immunoglobulin level and is easily calculated from routine liver function tests. This can provide valuable information at no extra cost. Previous research has demonstrated its utility in screening for primary immunodeficiency.1,2

Aims

1. To evaluate the volume of patients that would require further investigations if screening were implemented
2. To identify patient groups where low calculated globulin is most common, were testing could be targeted.

Method

Retrospective data was collected for all liver function tests conducted at University Hospital Birmingham between 7th-14th December 2015. Calculated globulin was derived for each patient using the paired albumin and total protein results available via the Clinical Portal system.

A cut-off value of 18g/L was used as lower limit of normal, based on previous research studies. For patients with low calculated globulin recorded at any point between 7th-14th December, data was collected from electronic systems on comorbidities, source of sample (outpatient versus inpatient) and previous immunoglobulin testing.

Results

Results allowing calculation of globulin, with both albumin and total protein measurements from the same sample, were recorded for 5334 patients (7481 samples total). The calculated globulin ranged from 7 to 78g/L, with distribution shown in Figure 1.

Sixty-four patients (1.19%) had a calculated globulin below 18g/L. Of these samples, 47 (73.4%) were from patients admitted to hospital, and 17 (26.6%) were from outpatient attendances.

Only 10 of these patients with low calculated globulin had a recorded measurement of immunoglobulin levels within the previous 12 months (15.6%), with 46.8% having immunoglobulin levels measured at any point previously.

In this sample, 40.6% of patients with low calculated globulin had haematological disease, 18.8% were new solid organ transplant recipients, and 9.4% were previous transplant recipients. Other comorbidities included active (non-haematological) malignancy, recent surgery (both emergency and elective), renal disease, and active neurological disease undergoing treatment (Figure 2).

Conclusion

Calculated globulin is currently under-utilised. There is a significant proportion of patients with unrecognised secondary immunodeficiency, related to underlying disease and to medication, where screening and infection management should be targeted to reduce morbidity from infection and subsequent hospital admissions.

Using calculated globulin to prompt or reflex further testing may lead to additional investigations for 1% of patients per week.

As this data comes from a large tertiary centre, this sample may include a higher proportion of patients with complex diseases leading to secondary immunodeficiency, such as solid organ transplants or haematological malignancy. However, for many of these patients, their underlying diseases will be a chronic, lifelong condition, with long term treatment, requiring ongoing management and acute admissions at DGHs and less specialist centres.

References