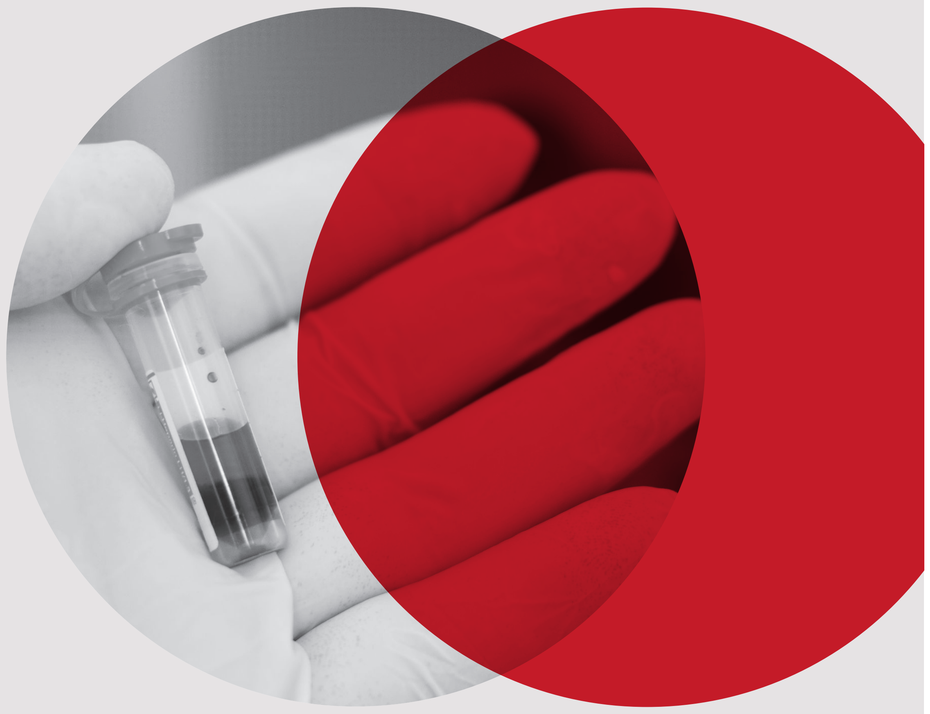
Reporting of haemolysed samples for common pathology tests



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Introduction

Haemolysis is a common preanalytical problem in clinical pathology. While there are guidelines on the assessment of haemolysis and procedures to accept or reject patient results,[1] some laboratories follow manufacturer instructions, others perform their own in-house studies. We sought to assess how Australian and New Zealand laboratories participating in the RCPAQAP Liquid Serum Chemistry program managed a haemolysed sample.

Method

Serum from consenting haemochromatosis patients was pooled. One half of the pool was spiked with fresh haemolysate (500µL in 800mL). The non-haemolysed, and haemolysed pools (Samples 21-03 and 22-04 respectively) were aliquoted, frozen and dispatched to 180 participants enrolled in the 2021 Liquid Chemistry program. In addition to submitting results (for up to 50 measurands) for the two pools, the sites were asked to upload a scanned PDF of the same report as they would for a patient. The results for the spiked/unspiked samples were analysed using RCPAQAP inhouse software. The PDF patient reports were reviewed to determine current practice in the reporting of haemolysed samples.

Results

Up to 220 results (for the common measurands, e.g. AST, Na, Glucose) and 65 PDF report examples were reviewed. We noted 22 groups/networks (21 in Australia and 1 in New Zealand) where there was similar reporting for haemolysis (within their network), and only included one example from each in the reporting review. Four sites/networks included a Haemolysis Index on their patient report examples (average of 53 mg/dL or +) for the haemolysed sample. Potassium and LD were the only measurands impacted (average of 0.3mmol/L for potassium, and 35U/L for LD, n=220). We noted the LD for the haemolysed sample (median 277 U/L) was flagged as abnormal when reported. Differences of up to 70U/L for LD were seen. All the other measurands, were within precision limits when compared to the non-spiked sample.

As shown in Figure 1 and Tables 1 and 2, the reporting practices for the matching "patient" reports on the spiked sample varied from no rejection of any measurand and no comment on haemolysis, to rejection of up to three results in varying combinations. Measurands rejected included potassium, LD, Magnesium, Folate, and TSH.

Discussion

While recognising the nature of the spike may not fully replicate a haemolysed patient sample, this review highlights the wide variation in accepting/rejecting results for a haemolysed sample. Some results appear to have been unnecessarily withheld, and others (e.g. LD) were reported with no flag or comment. Further, the way haemolysis interference is reported varies widely, and could easily be missed by the clinician reviewing the report.[2,3,4]

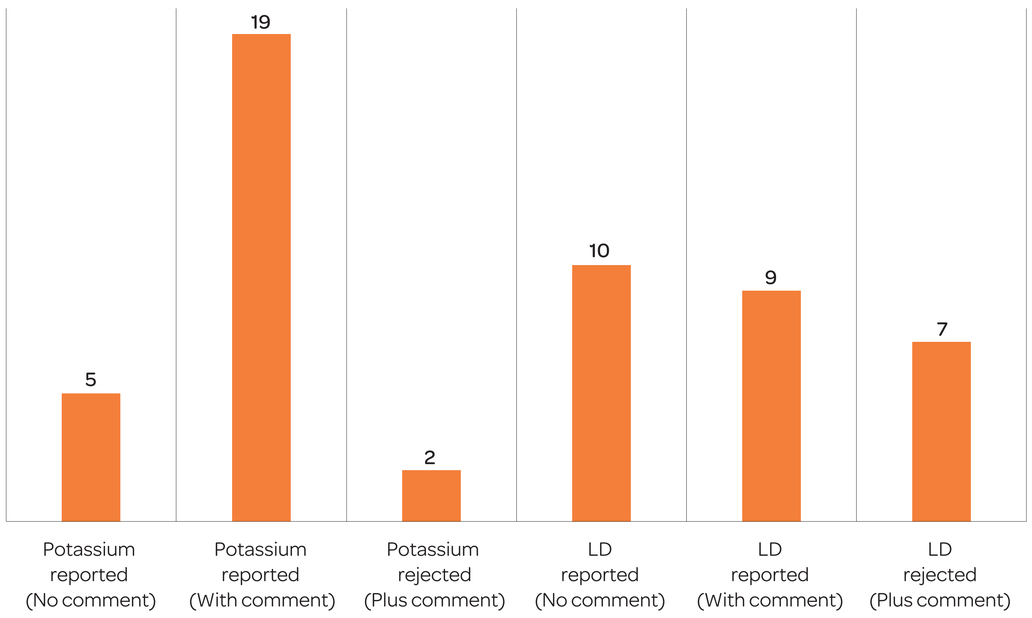

Figure 1. Number of sites /networks reporting/rejecting Potassium and LD in sample 22-04 with a Haemolysis Index of 53 (mg/dL).

Table 1. Measurands in addition to Potassium and LD either reported with a comment or rejected with an accompanying comment.

Measurand	Number Reported (with comment)	Number Rejected (plus comment)
ALT	1	0
AST	1	3
Conjugated Bilirubin	1	1
Magnesium	2	0
Vitamin B12	0	1
Serum Folate	0	1
TSH	0	1

Table 2. Examples of variation in flagging/rejecting results due to haemolysis.

Flag/Result	Number Reported (with comment)
:H	H= Haemolysed specimen
+	Slight haemolysis, potassium may be increased by up to 1 mmol/L
No flag against result	LD and AST may be falsely elevated due to mild haemolysis
Haemolysed	No comment noted
*	Sample Haemolysed
HAEM 1	No Result. Trace Haemolysis
TSH	0

Conclusion

The variation in reporting a mildly haemolysed sample in Australasia warrants further review. Unnecessary rejection of a result that is unaffected or failure to reject a result compromised by haemolysis impacts patient management and health resources. Patient safety may also be compromised if a clinician misinterprets a result that is not clearly flagged as potentially misleading.

References:

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4. Li L, Vecellio E, Gay S, Lake R, MacKay M, Burnett L, et al. Making sense of a haemolysis monitoring and reporting system: A nationwide longitudinal multimethod study of 68 Australian laboratory participant organisations. Clin Chem Lab Med. 2018;56(4):565–73.

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