RCPA Quality Assurance Programs Pty Ltd Presentations

PATHOLOGY USE STEWARDSHIP: PRE-ANALYTICAL REVIEW OF TISSUE SPECIMENS PREVIOUSLY PROCESSED BY DEFAULT FOR MYCOBACTERIAL CULTURE MAINTAINS THE QUALITY OF LABORATORY DIAGNOSIS AND OPTIMISES THE USE OF LABORATORY RESOURCES

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Aims: Default mycobacterial culture of all tissue specimens prevents missed diagnoses but remains resource-intensive, creates potential for false positives and consumes potentially 'precious' specimen. Through pre-analytical review, we aimed to optimise the use of laboratory resources while maintaining sensitivity.

Methods: Tissue specimens were either processed automatically (by site or request) or were reviewed for appropriateness by a Microbiology Registrar. Records of patients with cancelled mycobacterial cultures were reviewed for potentially missed infections via histopathology and any other mycobacterial cultures.

Results: 514 specimens were processed over 146 days; 229 (45%) cultures were cancelled after registrar review, 152 had culture added by the registrar and 133 cultures were performed 'automatically'. To date, 8 specimens are culture-positive, 7 of these had mycobacterial culture requested and 1 was registrar instigated. No patient with a 'cancelled' culture request was culture-positive for mycobacteria from another specimen, or had histological findings suggestive of mycobacterial infection. Nineteen of 112 (16%) requested cultures were delayed one day.

Discussion: Microbiologist pre-analytical review of tissue culture requests was rapid, allowed significant reduction of unnecessary testing with an estimated annual saving of \$25,220 and did not adversely affect service provision. All patients deemed to have possible mycobacterial infection had their specimens cultured.

AN AUDIT OF FRONTLINE (F)ISH TESTING OUTSIDE THE AUSTRALIAN SETTING ON HER2 POSITIVITY RATES IN BREAST CANCER AND THE IMPACT OF THE 2013 ASCO GUIDELINES

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Aim: To determine our HER2 positivity rates for invasive breast carcinoma using frontline FISH testing rather than CISH or SISH

in a laboratory outside Australia, and to understand the impact of the 2013 ASCO guidelines on overall HER2 positivity rates.

Data: The HER2 status in patients diagnosed with invasive breast carcinoma between 2009–2014 was determined on core or excision specimens sent to Canterbury Health Laboratories ($n=797$).

Results: HER2 positivity rates varied from 12–21%, with an average of 15.5%. With the introduction of frontline FISH testing, the overall HER2 positivity rate was 13%, below the average for the preceding 4 years of 16%, achieving similar rates for positivity as Bilous *et al.*¹ The 2013 ASCO guidelines resulted in an increase in overall Her2 positivity rates to 20.93%.

Discussion: Discussion points will include:

- Should New Zealand laboratories adopt the frontline ISH testing model as per College guidelines?
- Does frontline ISH testing save money from a whole of systems perspective?
- The impact of ASCO guidelines on HER2 positivity rates in breast cancer.
- Is it time to change the testing algorithm to an ISH only model?
- Suggested guidelines for dealing with equivocal FISH results.
- Treatment implications for ISH negative, IHC positive results.
- Interesting cases of IHC and FISH discordance.

Reference

1. Bilous M, Morey AL, Armes JE, *et al.* Assessing HER2 amplification in breast cancer: findings from the Australian In Situ Hybridisation Program. *Breast Cancer Res Treat* 2012; 134: 617–24.

EVALUATION OF THE BD MAX MULTIPLEX ENTERIC PATHOGEN PCR SYSTEM VERSUS ROUTINE CULTURE – RAPID AND ACCURATE DIAGNOSIS OF COMMON BACTERIAL DIARRHOEAL DISEASE

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Aims: To validate the BD Max Enteric Bacterial stool pathogen multiplex PCR system (Becton Dickinson and Company, USA; hereafter 'PCR') for Salmonella, Campylobacter and non-dysenteriae Shigella spp. against routine culture in our laboratory.

Methods: Non-consecutive stool specimens for routine culture were additionally processed into the PCR assay. The PCR was performed in accordance with the package insert. Culture was undertaken on XLD agar, Salmonella Chromagar and Campylobacter charcoal agar under routine conditions. Discrepant results were repeated, clinically correlated and had a second PCR performed, where possible.

Results: 542 specimens were processed. There were 16 *Campylobacter*, 7 *Salmonella* and 2 non-dysenteriae *Shigella* spp. positive by culture and 23 *Campylobacter*, 9 *Salmonella* and 3 non-dysenteriae *Shigella* spp. positive by PCR. All culture positive specimens were PCR positive. Sensitivity of PCR was 100% and specificity 99%, with an NPV of 100% for *Campylobacter*, *Salmonella* and non-dysenteriae *Shigella* spp. PPV was 78% for *Salmonella* spp., 70% for *Campylobacter* spp. and 67% for non-dysenteriae *Shigella* spp.

Discussion: The PCR allows considerably faster turn-around time with high sensitivity and specificity. Published data, discrepancy resolution and clinical correlation suggests this low PPV reflects a proportion of PCR-positive but culture negative true disease.

FIRST STEPS IN THE HARMONISATION OF ADULT PLASMA AMINO ACID REFERENCE INTERVALS IN AUSTRALASIA

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Six laboratories in Australasia use the same technology to measure plasma amino acids (PLAA) to aid in the investigation of associated inborn errors of metabolism (IEM). There is considerable variation in reference intervals (RI) for PLAA and harmonisation across the laboratory group was suggested.

Aim: To determine adult PLAA RIs using combined data from the six Australasian laboratories.

Method: Inter-laboratory variation was determined for PLAA by analysing External Quality Assurance (EQA) ($n=8$) returns from each laboratory.

Results of 22 PLAA on 2107 patients over 16 years of age from 6 centres were statistically analysed after removal of known IEM patients and outliers. Gender specific data and population distributions were analysed.

Results: The between laboratory coefficient of variation (CV) for 17 amino acids was 4–10% and 4 amino acids had CVs >15%. There was no significant bias from the ERNDIM group. There were gender specific interval differences for 11 amino acids; 2 were normally distributed; 14 required log-transformation and 6 were calculated non-parametrically.

Conclusions: There is acceptable agreement for most amino acids but significant differences for some amino acids possibly due to variation in standardisation and specimen handling.

Harmonisation is feasible after agreed changes to standard procedures in laboratories.

WHAT'S THE EMERGENCY? IDENTIFICATION OF IRON DEFICIENCY ANAEMIA TO EVALUATE TRANSFUSION APPROPRIATENESS

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Aim: We evaluated anaemia management and transfusion practice in the emergency department (ED) as part of a comprehensive audit program in place for compliance with NSQHS Standard 7 and NHMRC Patient Blood Management guidelines.

Methods: A pilot audit of anaemia presentations was conducted over one month. Patients were selected from blood bank records indicating transfusion of red cells. Iron status was categorised as 'deficient', 'probable', 'unlikely' or 'uncertain' using FBE, blood film and iron studies, where performed. Red cell transfusion was 'appropriate', 'appropriate indication (not quantity)' or 'possibly not required' using clinical and laboratory findings.

Results: Of 31 cases (17 acute bleeders, 11 no acute bleeding, 3 with transfusion decisions made beyond ED), only 55% had iron studies, of which 25% were iron-deficient and replaced with iron. 23% had probable iron deficiency. In subacute anaemia, 82% had iron studies, of which 78% were both iron-deficient and treated with iron. 11% of transfusions were possibly not required, 31% appropriate and 58% overtransfused.

Conclusion: Identification, investigation and management of iron deficiency can be improved in ED presentations with anaemia and could avoid transfusion in some patients. This audit establishes new baseline indicators upon which we can better align our PBM practice with guidelines.

UNUSUAL CAUSE OF PSEUDOHYPERKALAEMIA IN PRIMARY CARE CLINIC

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Backgrounds: Our hospital has three primary care clinics (PCC1, 2 and 3) outside the main campus. Blood sampled in PCC were sent to the hospital laboratory for analysis with transportation time 2–6 hours. PCC1 accounted for the highest rate of pseudohyperkalaemia, 21%, while the rest were below 5%. Root cause identification followed by constructive solution is urgently required to avoid unnecessary and potentially detrimental therapy due to pseudohyperkalaemia.

Method: From 3 October to 28 November 2013 systematic root cause analysis was conducted by simulation study focussing on preanalytical procedures including: (1) blood sampling technique, (2) sample preparation procedure while sitting in PCC waiting for courier to pick up, (3) transportation conditions including temperature and turbulence effect leading to red cell sediments remixed with plasma during speedy driving, and (4) potassium stability in gel separated plasma up to 9 hours. Statistical analysis tools Deming regression and Bland and Altman plot were adopted.

Results: Excessive fist clenching was identified to be the culprit. Pseudohyperkalaemia was recorded in 10 out of 16 study cases. Upon elimination of the inappropriate procedure, up to 22 September 2015 the occurrence rate of pseudohyperkalaemia in PCC1 dropped dramatically to 7%, comparable with those in PCC2 and PCC3.