

# “WITHOUT LABORATORIES, MEN OF SCIENCE ARE SOLDIERS WITHOUT ARMS”

Dr Low Lian Leng, Dr Low Sher Guan Luke

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The above quote by Louis Pasteur says it all. The National Health Services of the United Kingdom has estimated that 70–80 percent of all healthcare decisions affecting diagnosis or treatment involve a pathology investigation.<sup>1</sup> Both the complexity and quantity of clinical laboratory tests are rapidly expanding, where the number of laboratory tests available to clinicians has more than doubled in the past 20 years.<sup>2</sup> This presents primary care physicians with challenges in ordering and interpreting diagnostic tests in an accurate, efficient, and safe manner. In a large survey by Hickner et al,<sup>2</sup> primary care physicians ordered diagnostic laboratory tests for approximately 31 percent of patient encounters (approximately 25 times a week). They reported being uncertain about which test(s) to order for 14.7 percent of patients who needed diagnostic laboratory tests, and about interpreting the results for 8.3 percent. Translating this to 5.8 million Singaporeans, this represents a large number of patients with potentially incorrectly ordered or interpreted laboratory tests. The survey of PCPs also showed that physicians are frustrated with various aspects of the testing process; including confusing test names, slow turnaround times, difficulties accessing prior results, and

variations in reference ranges and report formats among laboratories. Interestingly, only 6 percent of PCPs surveyed would consult a laboratory physician in the event of uncertainty during interpretation of laboratory test. This Family Practice Skills Course in laboratory medicine is a first and provides a timely update to bridge clinical and laboratory medicine.

Unit 1 by A/Prof Robert Hawkins reviews the common pre-analytical and post-analytical factors relevant to primary care which most often affect laboratory results in healthy individuals and which explain unexpected results. These pre-analytical factors include diet and fasting; exercise; posture; tourniquet application; time of day; blood collection tube anticoagulants; and specimen processing. Post-analytical factors include test results sent but not received by the correct caregiver; failure to respond to test results promptly; inter-laboratory variability in methodology and numeric results; and application of inappropriate reference intervals. A/Prof Hawkins highlights the importance of education of and cooperation among clinicians, nurses, clerical staff, phlebotomists, and laboratory professionals to assure that the right specimen is drawn under the right set of circumstances. In terms of post-analytical processes, care must be taken to ensure that the right report goes to the right clinician within the right timeframe, particularly for critical results, and that a consistent laboratory methodology is used for serial laboratory test monitoring.

Unit 2 by Dr Cynthia Chee provides an update on latent tuberculosis infection (LTBI), efficacy of isoniazid preventive therapy, and the target group to undergo LTBI testing. Around 10 percent of immunocompetent adults with LTBI will develop active tuberculosis infections in their lifetime. The risk of progression of LTBI to active TB disease is increased in very young children, end-stage renal failure on haemodialysis, and

those with diabetes; patients who are commonly encountered in family practice. Therefore, a targeted approach for LTBI testing is recommended to ensure that the benefits of isoniazid preventive therapy outweigh the risk of hepatotoxicity.

Unit 3 by Dr Sharon Saw provides an update on the latest markers in thyroid function tests. Thyroid-stimulating autoantibodies (TSAb), also known as thyroid-stimulating immunoglobulins (TSI) are responsible for Graves' Disease, whereas thyroid-blocking autoantibodies (TBAb), which inhibit thyroid-stimulating hormones (TSH) binding to the thyroid receptor, result in hypothyroidism. Previously, clinical laboratories routinely offer a TSAb immunoassay while TSI was more of a research tool in the bioassay format. More recently, a new TSI immunoassay has now become available to the clinical laboratories. However, there remains a lack of inter-assay comparability, and it is recommended that patient monitoring be performed by one method in one laboratory. It is also noteworthy that both TSI and anti-thyroid drugs readily cross the placenta and affect foetal thyroid function. A pregnant GD patient should be regularly monitored throughout pregnancy, while a newborn should be assessed based on thyroid results at birth and maternal thyroid history.

A selection of ten readings by A/Prof Goh brings thyroid conditions and tuberculosis to our readers. The first three readings cover the common dilemmas encountered in thyroid conditions such as investigation and management of Graves' disease and toxic nodular goitre, when to start treating subclinical hypothyroidism, and managing thyroid disease in pregnancy.

The next seven readings are interesting reads for tuberculosis. Of note that is particularly applicable in our local context will be readings 5 and 6 that cover the diagnosis and management of latent tuberculosis, identifying those at highest risk of progression to active tuberculosis to be treated.

Dr Valerie Teo contributes an original article which is a topic review on tension type headaches (TTH). It is the commonest primary headache with strong relationship to muscular factors. Therefore, it is not surprising that treatment directed toward muscular factors such as manual therapy can be considered. Dr Teo has found that the headache frequency, intensity and Headache Impact Test (HIT-6) scores improve with manual therapy. However, further studies are still required before manual therapy can be strongly recommended as an option for TTH.

Dr Charlotte Tan contributes a case report on 2 elderly patients of Asian origin who presented with pyrexia of unknown origin, and were found to have the rare condition of giant cell arteritis, albeit atypically. Its difficult diagnosis can pose delays in treatment and result in serious complications. A high index of suspicion is needed for prompt diagnosis and treatment, and the temporal artery should be biopsied in such cases.

We have 2 PRISM articles for this issue. Dr Joanne Khor writes on a young boy who presented with a rare cyclical vomiting syndrome after overseas family trips. The aetiology of this syndrome remains unknown, but the diagnosis was confirmed by excluding acute surgical and medical conditions, and demonstrating a response to expectant treatment. The way to manage this condition is proper recognition and early prophylactic treatment.

Dr Sarah Hoon writes up on a patient with urinary tract symptoms but with a twist. He presented multiple times with dysuria, resolving each time with treatment. But symptoms worsened with each recurrence of dysuria and the patient was eventually found to have terminal lymphoma which constantly irritated the bladder, giving rise to dysuria symptoms.

The CASE RECORDS OF FAMILY MEDICINE is a newly created series to encourage those from family medicine teaching programmes, family medicine departments, and specialist colleagues to submit cases of learning value in family medicine to the Singapore Family Physician. It differs from the PRISM series in requiring a short literature review on the latest evidence/guidelines (related to diagnosis and/or management) of the case, or to highlight the gaps of knowledge if such evidence is lacking. Author(s) should also suggest ways to apply the new knowledge in clinical practice or to highlight the limitations of its applications, if any. Cases discussed during peer review learning, and family medicine grand ward round teachings are just some examples that are suitable for this series. More details on the structure of article submission to this new series are available in the latest GUIDELINES AND INFORMATION FOR AUTHORS at the end of the journal.

#### REFERENCES

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2. Hickner J, Thompson PJ, Wilkinson T, Epner P, Shaheen M, Pollock AM, et al. Primary Care Physicians' Challenges in Ordering Clinical Laboratory Tests and Interpreting Results. The Journal of the American Board of Family Medicine. 2014;27:268–74.