

Letter to the Editor

On Diagnostic Acumen: Old Tradition, New Dimensions, and Personal Views

Introduction

Diagnostic acumen may be defined as the ability to make clinical diagnosis quickly and correctly.¹ A successful diagnostic process is the most important part in the management of a patient. Today, despite the availability of many new investigations, history and physical examination is still useful in 60-70% of cases and should remain the cornerstone of our diagnostic enquiry.² With the increased application of modern technologies and the new working environment, the importance of traditional bedside approach seems to have been dwindling. The high standard of diagnostic acumen should be enhanced by re-emphasizing clinical methods, intelligently applying new technologies and modernising paediatric education.

Importance of History Taking and Differential Diagnosis

Now in history taking, the clinician would need to become more focused in gathering relevant information and formulate a list of differential diagnostic hypotheses. The number of diagnostic hypotheses in mind is usually around five; more than this may not be actively retained.³ It is more efficient if the clinician knows the local incidence of the different diagnoses for the presenting symptom and forms a mental checklist according to the clinical (pre-test) probability. The diseases presenting to various levels of complexity of clinical care are different. The important not-to-be-missed diagnoses like meningitis in convulsion and malignancy in recurrent headache should be considered. When the clinical data do not fall into the common ones, the rarities would need to be looked for. There are references in which differential diagnoses are listed according to their incidence, and the red-flag system is put up to prevent clinicians from missing serious ones.⁴

Because the complexity of clinical care has been increasing, one should not be totally dependent on one's

memory or intuition for diagnosis especially in complicated cases. Occasionally, checking on references from books, the internet, or mobile phone apps may be necessary. However, there is a risk of relying too much on the web rather than internalising medical knowledge and clinical experience in oneself. Formal and informal consultations with other specialists is sometimes necessary.

Clinical checklists, diagnostic paths, algorithms, and computer questionnaires are becoming more common and they can be, to a certain extent, complementary to the clinician's subjective history taking and discernment. As explained in the later part of this article, they actually allow the clinician to switch from the intuitive to analytic way of reasoning and thus avoid common pitfalls and blind spots in memory.⁵

Some patients and relatives are reluctant to tell others their family problems. It is only after mutual trust building and tactful probing that they may tell the doctor psychosocial issues like separation of parents, financial difficulties, adoption etc. Occasionally the patient and the family members may need to be interviewed separately in private. In Hong Kong, like other developed areas, there have been more and more psychosomatic problems, e.g. depression, irritable bowel syndrome. Paediatricians should be better trained in diagnosing these new morbidities.

Variations in Physical Examination

In many consultations, the time limit only allows the clinician to, based on the hypotheses generated from history taking, do a general physical examination plus focused examination on the relevant systems. It is important to know what are the normal physical features and variations, e.g. physiological enlargement of thyroid in adolescents, the wide ranges in different reflex responses. Experience would tell that, when the children are anxious, there are variations in their neurological signs and developmental assessment responses.

With progress in technology, more objective measurements and diagnostic investigations are used as complement to physical examination. There is a new electronic stethoscope and a small handheld ultrasound

machine being manufactured; hopefully these would become more widely available for clinicians. For some physical measurements, one needs to find the relevant nomograms for children. Some are special, e.g. size of penis for boys and clitoris for girls. In some cases, the measurement may lie mildly outside the defined statistical percentiles; this does not always indicate disease.

The trainees would, understandably, make some errors in physical examinations during the early part of their training; they can always improve under good supervision. For some difficult cases, signs in hidden areas like the buccal cavity, back, axilla, perineum and areas covered by hair should be looked for. Managing more patients with wide spectra of clinical problems would sharpen one's diagnostic acumen.

Investigations – More or Less?

After the history taking and physical examination one should have in mind some hypotheses about the differential diagnosis. To confirm or rule out the hypotheses, or to assess the severity or progress of the disease, ordering of investigations would be considered. For some non-alarming symptoms and signs, further testing is unnecessary because it will not change the prognosis or treatment. Over-reliance on technology has contributed to loss of clinical bedside skills.⁶ Undisciplined use of laboratory tests and imaging modalities is a major cause of increasing health costs and leads to further inappropriate testing and patient harm.⁷

The interpretation of common investigations needs to be familiarised. The local age-appropriate standards and relevant references on interpretation of investigation results should be consulted from time to time. The clinical significance of marginally deviated results needs to be considered. The use of statistical techniques to define normal and abnormal (e.g. greater or lesser than two standard deviations from the mean) automatically labels a fixed proportion of the tested population as abnormal in the test, regardless of whether this degree of deviation from the average has any physiological significance.⁸ If available, the sensitivity and specificity, or positive and negative predictive values, or likelihood ratios of some particular tests, such as those for autoantibodies titres, would need to be known. Statistically speaking, if a healthy individual undergoes 12 tests, such as those on a standard 12-test chemistry panel that use the plus-or-minus-two-standard-deviations rule for normalcy, the chance that all 12 results

will be normal is only 54%. If the tests are overdone, there is a risk of obtaining questionable results that can generate additional mindless search for answers to diagnostically insignificant questions.⁸ There is a saying that doctors should: 'treat the patient, rather than the laboratory report'.⁹ Diseases occur in spectra, and may evolve with time. If one feels unsure or whenever appropriate, the test can be repeated. Subsequent diagnostic tests for the same patient may show up more abnormalities.

The many new genetic tests are very useful. But for predictive tests, they are not 100% accurate and should better be handled by the clinical geneticists. The recent advances in the genetic and molecular basis of diseases, enzymology, structures and functions of proteins etc. affect our application and interpretation of the relevant laboratory tests.

The selection of investigations and treatment modalities depends also on the patient's or parents' informed choice, psychosocial factors and, sometimes, financial situation as well. A balanced approach is required to avoid unnecessary venepunctures, painful procedures and invasive investigations on children which may lead to the "paediatric medical traumatic stress" problem.¹⁰ We should also pay more emphasis on pain control measures like using local anaesthetic patch,¹¹ sugary solution and nitrous oxide inhalation etc.

Diagnostic Process

The diagnostic process is actually a hypotheses generating and active synthesising and deduction process based on probabilities. In essence, there are two modes of diagnostic thinking.¹² Intuitive reasoning is fast, effortless, reflexive, multi-channelled, used by experienced clinicians as pattern recognition. The other is analytical reasoning which is slow, deliberate and single-channelled. One uses pattern recognition for easy or familiar cases within one's specialty, and analytical thinking for difficult or unfamiliar cases. Repeated presentations to the analytical mode will eventually result in the patterns being recognised, and default to the intuitive mode occurs. In practice, both modes are common in the diagnostic process for senior doctors. They unconsciously compare the patients before them with the many cases they have seen previously, and they may recognise different diseases and syndromes out of their memory.⁵ The ability to recognise patterns is one of the most powerful properties of the human brain, which till now no

ordinary computer or algorithms can match.⁶ In future, it would be interesting to see the development of Artificial Intelligence in clinical diagnosis.

When new clinical data should come up during the progress of the illness, the clinician can revise and cut down the number of possible diagnoses till the final or most probable one. In some cases, a therapeutic trial may form part of the diagnostic process, balancing the risks, costs and benefits. This involves the concept of "treatment threshold" which means the probability at which the clinician is "sure enough" of the diagnosis to begin treatment.¹³

Many patients are getting medical information and diagnosis from the internet, unfortunately such information may not be accurate and can cause anxiety especially in those with a hypochondriac tendency. Knowledge does not equal wisdom; it is too easy for nonexperts to take, at face value, statements made confidently by voices of authority. Physicians are in the best position to weigh information and advise patients, drawing on their own understanding of available evidence as well as their training and experience. Their diagnostic acumen is of no less importance in this era of the internet.¹⁴

Conclusion

The good diagnostician picks up the alerting cues and clues, asking probing questions, and thinks logically; the process is an amalgam of common sense, instinct, experience and observation.¹⁵ Our trainees, specialists and senior paediatricians should continually develop our clinical acumen and become master clinical diagnosticians so that we can provide better healing service to children.

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