

SPECIFIC INTRODUCTORY COMMENTS

CLINICAL PROBLEM SOLVING

"Where is all the wisdom we have lost in knowledge?
Where is all the knowledge we have lost in information".

T S Eliot, 1888-1965.

"Discovery.....is a byproduct of making things simpler"

Jerome Bruner.

The general aim of the following chapters is to illustrate how clinical problems can be solved in a number of different areas. In this respect, neither the chapters nor the topics are meant to be complete. But they do allow sufficient information to solve important individual patient problems. Relevant background physiology is therefore set out in the chapters as a prelude to the discussion of clinical problem-solving. Then appropriate clinical problems are set out at the end of each chapter to be solved by our method within the four diagnostic categories discussed. The questions that follow should then be easy to answer without your having to go back to the clinical data on each occasion.

The first part of this monograph deals with the problem-solving using clinical information alone, usually sufficient in organs which declare themselves well on history and examination. But this is not always so, e.g. with acid-base balance, electrolyte abnormalities and other metabolic disturbances; also with dysfunction of relatively hidden organs, as in intestinal malabsorption. In such cases, physiological and biochemical investigations may be needed to complete each diagnostic category, and this general area will be covered in later chapters.

The aim is make clinical diagnoses initially in four separate categories, namely

- (a) Anatomical diagnosis;
- (b) Pathological diagnosis;
- (c) Functional diagnosis; and
- (d) Aetiological diagnosis.

As we go along, you will see not only how this can be done, but how a conclusion in one category may help you reach a decision in another (e.g. CNS Anatomical diagnosis is entirely dependent on your assessment of the Functional derangements clinically), and also how they may overlap (e.g. if we know that a cerebral abnormality came on abruptly, it is most probably, in pathological terms, a vascular event, so we can then go back and reconsider our anatomical diagnosis in terms of *vasculaneuro-anatomy* rather than simple neurophysiology, e.g. acute right middle cerebral artery ?embolism).

Diagnostic category overlap may also help in a rather different way, namely by suggesting caution in one of your already-established diagnoses.

For example, we typically build up our pathological diagnosis of whether a condition is acute, chronic, etc. on the basis of the history, but this of course relates to clinical pathology, and the actual underlying pathology may have been developing for much longer. This is because most organs have a large reserve of function, so a pathological process such as hepatic cirrhosis or pulmonary emphysema may be present long before the patient notices symptoms, particularly if he rarely puts the organ concerned under load (e.g. shortness of breath on effort in emphysema).

A good example of the dissociation between function and pathology can be seen with myocardial ischaemia relating to atherosclerosis - where patients have often been building up atherosclerotic for years - but because the resultant narrowings are short and focal, they initially offer very little resistance to blood flow, so that narrowing is often quite severe before symptoms such as angina occur. Moreover, it is often not the mere march of natural functional sequelae such as angina that eventually give rise to the clinical presentation from which we make our clinical pathological diagnosis, but the occurrence of complications: e.g. acute myocardial infarction from plaque rupture and superimposed thrombosis suddenly converting the partial coronary artery narrowing into a complete one.

Notwithstanding these reservations, the four diagnostic categories most often do overlap in a way which helps us reach a diagnosis within each. In difficult cases, combinations should be looked at both ways around, particularly in relation to cause and effect; for example is the mitral valve incompetence you have just diagnosed the primary anatomical diagnosis with secondary left heart failure and cardiac dilatation a consequence, or is it the other way round - first cardiac dilatation, then mitral regurgitation from a stretched mitral valve ring? Determining from the history which came first in time will help resolve these questions.

Where, anatomically, a number of systems seem to be involved, you should first apply the Occam's razor, i.e. is there one primary organ system involved with the rest of the symptoms and signs being secondary functional consequences? Take the case of a patient with hepato-splenomegaly, spider naevi, parotid swellings, gynaecomastia, testicular atrophy, jaundice, bruising, finger clubbing, palmar erythema, ascites, oedema, flapping tremor, and clouding of consciousness. Such disease seems to involve almost every organ and yet, with thought, it can be seen as primary hepatic disease with all

the secondary functional consequences of that. Hence the importance of knowing the clinical (functional) physiology of all organs.

Practical tips for Four columned Problem Solving.

1. Draw up four columns headed Where? What? How? and Why?, with the How? column being given greatest width to cope with most information. Assign each phrase of information to an appropriate column, and then draw some inference from it, however tentative. Later, link by arrows all information leading to like conclusions. And when you have enough information to draw a firm conclusion, rule off and highlight it as a sub-conclusion so that you won't overlook it in your final overall four-columned diagnosis at the end. Doing rule-off procedures will also help reduce the data to manageable proportions when you come to put your overall diagnosis together.

2. Rule off and make an Interim diagnosis whenever:

(i) The time-course of the disease changes,

(ii). A new symptom appears.

This not only gives you a chance to summarize as you go along, but time to pause and reflect on why (Aetiology) things are changing.

All of this must seem rather like being given a written description of how to tie a neck-tie, where illustration would far better demonstrate the points. You should therefore now undertake the tutorials, and use the online book as background.

N.B. Some problem solving exercises are set out in the accompanying interactive computerized 'Tutorials.' Get familiar with the system by using the '**Quick Start**' first.

Further problem-solving cases can then be found at at the **end of each chapter** of this **online book**, with a tabulated graphic solution for you to compare with your own.