Atlas of Synovial Fluid Cytopathology

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Consultant Editor

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ATLAS OF SYNOVIAL FLUID CYTOPATHOLOGY

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Consultant Editor's Note

At the present time books on morbid anatomy and histopathology can be divided into two broad groups: extensive textbooks often written primarily for students and monographs on research topics.

This takes no account of the fact that the vast majority of pathologists are involved in an essentially practical field of general diagnostic pathology providing an important service to their clinical colleagues. Many of these pathologists are expected to cover a broad range of disciplines and even those who remain solely within the field of histopathology usually have single and sole responsibility within the hospital for all this work. They may often have no chance for direct discussion on problem cases with colleagues in the same department. In the field of histopathology, no less than in other medical fields, there have been extensive and recent advances, not only in new histochemical techniques but also in the type of specimen provided by new surgical procedures.

There is great need for the provision of appropriate information for this group. This need has been defined in the following terms:

1. It should be aimed at the general clinical pathologist or histopathologist with existing practical training but should also have value for the trainee pathologist.
2. It should concentrate on the practical aspects of histopathology taking account of the new techniques which should be within the compass of the worker in a unit with reasonable facilities.

3. New types of material, e.g. those derived from endoscopic biopsy, should be covered fully.
4. There should be adequate number of illustrations on each subject to demonstrate the variation in appearance that is encountered.
5. Colour illustrations should be used wherever they aid recognition.

The present concept stemmed from this definition but it was immediately realised that these aims could only be achieved within the compass of a series, of which this volume is one. Since histopathology is, by its very nature, systemized, the individual volumes deal with one system or where this appears more appropriate with a single organ.

Cytopathology is becoming an increasingly important part of the work of the diagnostic histopathologist. Cells from a wide variety of sources are presented for diagnosis. This volume deals with joint fluids. There is a detailed account of technical methods followed by descriptions of the various cells and crystals found in diseased joints. This is one of the early volumes on this subject and is a valuable bench manual for those involved in diagnostic cytopathology.

G. Austin Gresham
Cambridge

Preface

Like all specialized areas of medicine, that of joint disease has become surrounded by a practical mystique and jargon specific to itself. The number of clinicians working in the field is large but the number of pathologists small. It follows that the majority of pathologists are at somewhat of an immediate disadvantage when discussing and analysing articular problems with their rheumatological and orthopaedic colleagues.

In the specific area of synovial fluid examination the difficulties for the pathologist are compounded because to date there have been no basic texts that detail the methods, findings and interpretation of the macroscopic and microscopic characteristics of the fluid in the common arthropathies. In this book we hope to go some way towards rectifying this omission.

The atlas type of format lends itself well to an introductory volume to what is, after all, a very visual form of tissue analysis. The detailed descriptions of each disease have been kept to a minimum but there are key references to each disease in the relevant chapter and at the end of this preface there is a short list of useful books which discuss the diseases, but not the synovial fluid findings, in greater detail.

The text and methodology are necessarily didactic, representing a distillation of 15 years' experience of synovial fluid cytoanalysis. We have adopted this approach because there is no uniformly accepted analytical system for synovial fluid and we understand our techniques and interpretation. Furthermore, local clinicians find our data and interpretation accurate and

informative. The techniques, practical and interpretive, are highly reproducible and simple, allowing them to be applied in any laboratory.

Although we see this volume as being of value to all interested in joint disease it is specifically aimed at laboratory staff wishing to offer a synovial fluid analytical service. Like most cytology we believe much of the cell and non-cell identification and quantitation can, and should, be undertaken by trained technical staff. The book is therefore aimed primarily at two groups: pathologists who do not specialize in joint disease and technical staff who will be generating the data on which interpretation will be based. It is therefore both a text book and a bench reference manual.

We do not believe our data or methodology represent 'the last word' in synovial fluid analysis; rather we hope this book will act as a basis for developing a uniform diagnostic approach to this tissue. Only in this way will there come a greater understanding of the problems, secrets and answers hidden in this unique medium.

Useful References

1. Scott, J. T. (ed.) (1986). *Copeman's Textbook of the Rheumatic Diseases* (two volumes). (Edinburgh: Churchill Livingstone)
2. Rodnan, G. P. and Schumacher, H. R. (eds.) (1983). *Primer on the Rheumatic Diseases*. (Atlanta: Arthritis Foundation)
3. Dieppe, P. and Calvert, P. (1983). *Crystals and Joint Disease*. (London: Chapman and Hall)
4. Currey, H. L. F. (1988). *Essentials of Rheumatology*. (Edinburgh: Churchill Livingstone)

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