DISEASES OF THE FETUS AND NEWBORN

Pathology, radiology and genetics

Edited by

G.B. REED, A.E. CLAIREAUX and A.D. BAIN

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Dr A. Douglas Bain, our co-editor, died in January 1987 just as the manuscript was being completed. His sudden death was greatly mourned by colleagues and friends all over the world. We wish to dedicate this book to his memory and his many contributions to pediatric genetic pathology

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PREFACE

Our understanding of the pathogenesis of diseases and disorders in the fetus and newborn infant has undergone considerable change during the past decade. Hitherto, most textbooks were concerned with the description of structural changes due to disease processes or developmental abnormalities occurring *in utero*.

In the present volume we attempt to expand our understanding and concepts beyond pure morphology by incorporating studies utilizing new diagnostic and screening techniques in examining the pregnant mother, fetus and newborn child. The opening chapters consider some of the more general aspects of disease, malformation and neoplasia.

This first section is followed by an up-to-date consideration of pathological changes in the more important organs and systems. In this portion of the book the authors do not confine their discussions to pure morphology but include some of the newer types of investigation, including immunology, enzyme histochemistry and molecular biology. The latter has recently made fundamental advances in our knowledge of the haemoglobin molecular defects in sickle cell disease and in thalassaemias.

It is important to remember that a number of abnormalities which are present at birth may not manifest themselves clinically until later infancy or childhood.

The third section is mainly concerned with prenatal screening and diagnostic investigations of the fetus and newborn using a variety of new techniques such as Imaging: ultrasonography, MRI and nuclear medicine.

In the final section on medical genetics, the impact of molecular biology and recombinant DNA are emphasized as also are cytogenetics, oncogenes, biochemical genetics and maternal blood markers. The interventional methods of chorionic villous sampling, amniocentesis and fetal tissue sampling are reviewed by experts in their fields.

Some suggestions are given by the authors as to the relative value, usefulness or accuracy of each diagnostic technique. The necessity of correlating findings and of communicating them between the team of experts is stressed.

Several themes recur throughout the book and will become evident to the reader. One is the assumption that biomedical and technical advances have revolutionized obstetrics and medical genetics, and the benefits of these advances enhance the likelihood of improved medical care. Another theme is the basic interdependence of many disciplines, such as enzymology, cytogenetics, ultrasonography, and *in utero* interventional methods and the proper use of pre and postnatal genetic counselling. Finally there is the common thread that ties the DNA molecule in the genome, which may untie or break during gametogenesis. This in turn may lead to such seemingly disparate disorders such as retinoblastoma, Down's syndrome or Huntington's

chorea. Therefore despite the genome and its importance we lack information about its relationship to development, maldevelopment or its reaction to the environment. Pathologists can play a pivotal role in such studies and improve the understanding of the pathogenesis of many diseases that remain unsolved. As Douglas Bain wrote:

> '. . . Even in those disorders where the metabolic defect is not expressed in the cultured cells, advances in molecular biology . . . [such as fetal DNA] suggest that prenatal diagnosis and carrier detection may prove feasible. These powerful techniques hold great hope for the future but the development of their potential will depend on a supply of appropriate samples.'*

More recently in the Farber lecture† Opitz has drawn attention to the importance of chromosomal abnormalities in total mortality and stresses the need for diagnostic and genetic counselling, appropriate monitoring of the next pregnancy and the possibility of monitoring teratogenic activity or increases in mutation rates.

In a book of this nature, some overlap is inevitable. We have tried to keep this to a minimum and have cross-referenced information where it seemed appropriate.

We hope this book appeals to a wider audience than the pathologist or laboratory scientist. The care of the fetus and future well being of the infant and child can only be safeguarded by the concerted effort of a multidisciplinary team, including obstetricians, paediatricians, histopathologists and scientists devoted to that objective.

Increased knowledge increases responsibility. Some of the new techniques may reveal abnormalities in the fetus in early pregnancy. In some instances these abnormalities may be of such a nature that a termination of pregnancy is the only reasonable course to follow. In others the defect may be amenable to treatment either before or after delivery and termination of pregnancy is not the correct approach. The vigilance by a team of experts devoted to the study of all aspects of each individual case will ensure that in future correct decisions are made.

We would like to thank Mr G. W. Anderson, Mrs S. Chibett and Miss J. Barber and all the staff of the Department of Histopathology, Hospital for Sick Children, Great Ormond Street, London and the Department of Pathology, Royal Hospital for Sick Children, Edinburgh. In particular Sheila Bartholomew, Guy Besley and Patricia Ellis.

*Editorial (1984) Perinatal pathology. *Lancet*, i, 431–2.
†Opitz, J. (1987) Prenatal and perinatal death. *Pediatr. Pathol.*, 7, 363–74.

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