

# Placental Pathology, a Survival Guide

Drucilla J. Roberts, MD

• Placental pathology continues to be an underutilized, undertaught, and inadequately handled surgical subspecialty. The requests for placental pathology are soaring, due partly to demands from obstetricians and to the litigious environment in which they practice, and to improved obstetrical care leading to pregnancies in medically challenging situations. Evaluation of the placenta requires a good understanding of the questions and issues concerning both the fetus/infant and the mother. Information from placental pathology can be critical in early neonatal care and in reproductive planning for the family, and it can provide risk assessment for neurologic outcome of the infant. A comfortable interaction among the obstetric staff, mothers, and pathologists often obviates need for legal intervention in unexpected pregnancy outcomes. Some critical pathologic features that involve maternal and fetal management are illustrated herein. A template for gross examination and a few critical histopathologic diagnostic features with clinicopathologic correlation are included.

(*Arch Pathol Lab Med.* 2008;132:641–651)

## GROSS PLACENTAL FINDINGS/EXAMINATION

I believe that all placentas should have at least a gross examination, saving the full histopathologic examination for a defined subset (Table 1). At the Massachusetts General Hospital, all placentas are delivered to the pathology department with a minimal required set of clinical information: maternal gravidity, parity, gestational age, and a blank section to provide any other information deemed pertinent by the obstetric staff. Using only these provided data, we triage the placenta into a "hold" or "examine" category. Hold placentas are those that do not meet criteria as described in Table 1 and are basically normal-term singleton livebirths who received prenatal care and delivered in the hospital without maternal or fetal/infant pathologic history or complications. The hold placentas are placed in a large, locked refrigerator for at least 7 days and are disposed of after 7 days so long as the infant is not transferred to the neonatal intensive care unit and the

mother is not readmitted with an obstetric or other complication. Maternal admission and neonatal intensive care unit admission lists are checked daily for these events. The examine category includes all placentas from deliveries other than those described in Table 1 or are maternal readmissions or neonatal intensive care unit admissions.

Placentas are stereotypic organs that lend themselves to template gross description (Table 2), ensuring that all the important information is obtained and facilitating dictation and transcription. Deviations from this template—for example, twin gestation or other multiples or fragmented placentas—can be handled without the template or with minor deviations from it. The template ensures that the most critical information is noted: color, cord length<sup>1,2</sup> (standards in Figure 1), lesions, and trimmed weight.<sup>3,4</sup> The importance of these gross findings is listed in Table 3. This also allows for easy sampling, as once the gross template is complete the necessary sections needed for histology are neatly outlined. We take at least 2 sections of cord (proximal to the placenta and proximal to fetus), 1 membrane roll (including the membrane rupture site), and 3 full thickness sections of parenchyma, including chorionic plate vessels. All parenchymal lesions should be sampled (just a small representative section), and at least one "normal" representative section of parenchyma needs to be sampled.

These "chunks" of placenta, the membrane roll, and the cord sections are placed into a small specimen jar with 10% formalin and fixed for at least 4 hours. Very sick babies or mothers need pathologic interpretation promptly, and these specimens should be processed the same day as accessioned. Others can be fixed overnight, or as convenient. We fix the remaining placental tissues as well and save it until the case is complete.

## HISTOLOGIC FINDINGS

Remembering that the placenta is an organ with circulations from both the mother and the fetus, examination of the placenta should look for pathology from both individuals. Historically, the focus of placental histopathology has been on maternal side diseases/disorders. Recently, much attention has been focused on the fetal side. There may be much more importance in the fetal histopathology of the placenta in terms of predicting or explaining subsequent morbidity.

Maternal side diseases/disorders that affect the placenta are many and are too numerous to describe herein. Instead, I will focus on those that have been shown to have important fetal sequelae or recurrence risk.

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# Placental Pathology A Survival Guide

**Ensheng Dong**



## **Placental Pathology A Survival Guide:**

**Autopsy Pathology: A Manual and Atlas E-Book** Andrew J Connolly, Walter E. Finkbeiner, Philip C. Ursell, Richard L. Davis, 2015-08-19 A mainstay for pathology residents Autopsy Pathology is designed with a uniquely combined manual and atlas format that presents today s most complete coverage of performing interpreting and reporting post mortem examinations This lasting and useful medical reference book offers a practical step by step approach to discussing not only the basics of the specialty but the performance of specialized autopsy procedures as well Material is divided into two sections for ease of use a manual covering specific autopsy procedures biosafety generation of autopsy reports preparation of death certificates and other essential subjects and an atlas organized by organ system which captures the appearance of the complete spectrum of autopsy findings Covers forensic pathology in a chapter introducing the subspecialty Offers expanded coverage of microscopic anatomy Includes a chapter on performing special dissection procedures that may not be covered during a typical residency Examines important techniques such as autopsy photography and radiology microscopic examination supplemental laboratory studies and other investigative approaches Addresses the latest legal social and ethical issues relating to autopsies as well as quality improvement and assurance Presents more than 600 full color photographs depicting common gross and microscopic autopsy findings for every part of the body Correlates pathologic findings with their clinical causes to enhance diagnostic accuracy Improved images in the Atlas section provide greater visual understanding Additional online features include dissection videos demonstrating autopsy techniques downloadable commonly used forms for autopsy reports and calculators for weights and measures Expert Consult eBook version included with purchase This enhanced eBook experience offers access to all of the text figures images videos forms calculators and references from the book on a variety of devices

**Autopsy Pathology: A Manual and Atlas E-Book** Walter E. Finkbeiner, Andrew J Connolly, Philip C. Ursell, Richard L. Davis, 2009-02-17 This how to guide presents today s most complete coverage of performing interpreting and reporting post mortem examinations In addition to discussing the basics of the specialty this lasting and useful reference features information on the performance of specialized autopsy procedures The material is divided into two sections for ease of use a manual covering specific autopsy procedures biosafety generation of autopsy reports preparation of death certificates and other essential subjects and an atlas organized by organ system that captures the appearance of the complete spectrum of autopsy findings The updated second edition features a new chapter on the popular topic of forensic pathology Focuses on hospital autopsy while also providing a brief introduction to forensic autopsy Examines autopsy photography and radiology microscopic examination supplemental laboratory studies and other investigative approaches Includes a chapter on performing special dissection procedures that are usually not covered during a typical residency Presents over 590 full color photographs depicting common gross and microscopic autopsy findings for every part of the body Correlates pathologic findings with their clinical causes to enhance diagnostic accuracy Covers the hot

topic of forensic pathology in a new chapter introducing the subspecialty Addresses the latest legal social and ethical issues as well as quality improvement and quality assurance Features improved images in the Atlas section to give an even more useful visual reference

**Manual of Surgical Pathology** Susan C. Lester, 2010-07-27 Dr Lester's Manual of Surgical Pathology 3rd Edition offers complete practical guidance on the evaluation of the surgical pathology specimen from its arrival in the department to preparation of the final report Inside you'll find step by step instructions on specimen processing tissue handling gross dissection technique histological examination application of special stains development of a differential diagnosis and more This thoroughly revised New Edition integrates cutting edge procedures well as the latest staging and classification information Coverage of the latest standards and procedures for the laboratory and handling of surgical pathology specimens are valuable assets to pathologists pathology assistants and anyone working in a pathology laboratory Plus with Expert Consult functionality you'll have easy access to the full text online as well as all of the book's illustrations and links to Medline Features more than 150 tables that examine the interpretation of histochemical stains immunohistochemical studies electron microscopy findings cytogenetic changes and much more Presents a user friendly design concise paragraphs numbered lists and bulleted material throughout the text that makes information easy to find Offers detailed instructions on the dissection description and sampling of specimens Includes useful guidance on operating room consultations safety microscope use and error prevention Explains the application of pathology reports to patient management Discusses how to avoid frequent errors and pitfalls in pathology specimen processing Comes with access to expertconsult.com where you'll find the fully searchable text and all of the book's illustrations Includes all updates from the last three revisions of the Brigham Women's Hospital in house handbook ensuring you have the best knowledge available Features new and updated tables in special studies sections particularly immunohistochemistry with an increased number of antibodies covered keeping you absolutely up to date Provides new tables that cover the histologic appearance of viruses and fungi and a table covering the optical properties of commonly seen noncellular material for easy reference Incorporates the TNM classification systems from the new 7th edition AJCC manual including additional guidelines for the assessment of critical pathologic features Presents four new full size illustrations by Dr Christopher French and Mr Shogun G Curtis as well as 39 illustrations for the new tables on viruses fungi and noncellular material to aid in their recognition

The Washington Manual Obstetrics and Gynecology Survival Guide Jason Wright, Solange Wyatt, 2003 The Washington Manual Obstetrics and Gynecology Survival Guide provides all the essential obstetrics and gynecology information that every intern needs on the wards The Obstetrics section is subdivided into antepartum medical complications of pregnancy intrapartum postpartum and ultrasound and genetics The Gynecology section covers general gynecology gynecologic infectious diseases contraception urogynecology reproductive endocrinology and infertility and gynecologic oncology

Manual of Surgical Pathology - E-Book Susan C. Lester, 2022-06-24 Offering complete practical guidance on the evaluation of the surgical pathology

specimen the Manual of Surgical Pathology concentrates decades of experience from the faculty and staff of one of the busiest and most respected pathology departments in the world From a specimen s arrival in the department to preparation of the final report you ll find step by step instructions on specimen processing tissue handling gross dissection technique histological examination application of special stains development of a differential diagnosis and more The fully revised 4th Edition is an invaluable reference for practicing pathologists residents and pathology assistants as a practical everyday resource for learning and applying optimal specimen evaluation as well as an excellent guide for board review Helps you find information quickly with a user friendly design concise paragraphs numbered lists and bulleted material throughout the text Reflects the latest AJCC staging information as well as updates throughout on reporting procedures protocols and safety Offers detailed instructions on the dissection description and sampling of specimens and explains the application of pathology reports to patient management Provides procedures for new types of specimens including pulmonary image guided resections endoscopic mucosal resection endoscopic submucosal dissection laparoscopic hysterectomy or nephrectomy morcellation vertical sleeve gastrectomy and evaluation of breast implant capsules with a clinical suspicion of lymphoma Features dozens of illustrations that demonstrate the gross appearance of common pathologic lesions and more than 150 tables that examine the interpretation of histochemical stains immunohistochemical studies electron microscopy findings cytogenetic changes and much more Examines the specimens from every organ and system as well as bullets medical devices and foreign materials Includes a new chapter on occupational hazards for pathologists ranging from visual and musculoskeletal problems to exposure and prevention of workplace acquired infection and cancer Enhanced eBook version included with purchase Your enhanced eBook allows you to access all of the text figures and references from the book on a variety of devices

*Reproductive and Developmental Toxicology* Ramesh C Gupta, 2011-04-04 Reproductive toxicology is a complex subject dealing with three components parent placenta and fetus and the continuous changes that occur in each Reproductive and Developmental Toxicology is a comprehensive and authoritative resource providing the latest literature enriched with relevant references describing every aspect of this area of science It addresses a broad range of topics including nanoparticles and radiation gases and solvents smoking alcohol and drugs of abuse food additives nutraceuticals and pharmaceuticals and metals among others With a special focus on placental toxicity this book is the only available reference to connect the three key risk stages and is the only resource to include reproductive and developmental toxicity in domestic animals fish and wildlife Provides a complete integrated source of information on the key risk stages during reproduction and development Includes coverage of emerging science such as stem cell application toxicoproteomics metabolomics phthalates infertility teratogenicity endocrine disruption surveillance and regulatory considerations and risk assessment Offers diverse and unique in vitro and in vivo toxicity models for reproductive and developmental toxicity testing in a user friendly format that assists in comparative analysis

*Pathology of Childhood and Adolescence* Consolato M.

Sergi,2020-10-28 This book covers the full range of pathologic conditions encountered during childhood and youth including tumors and tumor like conditions of all organ systems with direct links to developmental biology pathways and genetics It provides a user friendly road map to the main diagnostic criteria and combines an organ related approach with an explanation of the diagnostic approaches to various specific diseases and syndromes including sequential segmental analysis of congenital heart disease More than 500 new full color macro and microphotographs using more than 500 multi photographic panels are included to provide a realistic basis for comparison macroscopically and under the lens and summarizing tables highlight key information in the concise form required for at a glance review Pathologists will find the book very helpful when signing out complex and challenging cases and it will also prove invaluable for exam preparation and continuing medical education     Medical Image Computing and Computer Assisted Intervention – MICCAI 2019 Dinggang Shen,Tianming Liu,Terry M. Peters,Lawrence H. Staib,Caroline Essert,Sean Zhou,Pew-Thian Yap,Ali Khan,2019-10-10 The six volume set LNCS 11764 11765 11766 11767 11768 and 11769 constitutes the refereed proceedings of the 22nd International Conference on Medical Image Computing and Computer Assisted Intervention MICCAI 2019 held in Shenzhen China in October 2019 The 539 revised full papers presented were carefully reviewed and selected from 1730 submissions in a double blind review process The papers are organized in the following topical sections Part I optical imaging endoscopy microscopy Part II image segmentation image registration cardiovascular imaging growth development atrophy and progression Part III neuroimage reconstruction and synthesis neuroimage segmentation diffusion weighted magnetic resonance imaging functional neuroimaging fMRI miscellaneous neuroimaging Part IV shape prediction detection and localization machine learning computer aided diagnosis image reconstruction and synthesis Part V computer assisted interventions MIC meets CAI Part VI computed tomography X ray imaging     *Fetal Growth, An Issue of Obstetrics and Gynecology Clinics. E-Book* Nathan R. Blue,Bob Silver,2021-05-14 In this issue of Obstetrics and Gynecology Clinics Guest Editors Nathan Blue and Bob Silver bring their considerable expertise to the topic of Fetal Growth Top experts in the field cover key topics such as placental function and physiology of fetal growth fetal growth and stillbirth fetal growth in multiple gestations and more Provides concise and comprehensive coverage of the issues physicians face every day Presents the latest information on a timely focused topic under the leadership of experienced editors in the field Contains 12 relevant practice oriented topics including recurrence risk of FGR fetal growth curves diagnosis of FGR and LGA routine third trimester sonograms and more

**Obstetrics and Gynecology** Susan Stephenson,Julia Dmitrieva,2022-08-03 Part of the highly regarded Diagnostic Medical Sonography series Susan Raatz Stephenson and Julia Dmitrieva s Obstetrics and Gynecology 5th Edition thoroughly covers the core content students need to master in today s rigorous sonography programs Careful collaborative editing ensures consistency across all three titles in this series The Vascular System Abdomen and Superficial Structures and Obstetrics and Gynecology providing the right content at the right level for both students and instructors     Medical Image

Computing and Computer Assisted Intervention – MICCAI 2023 Hayit Greenspan, Anant Madabhushi, Parvin Mousavi, Septimiu Salcudean, James Duncan, Tanveer Syeda-Mahmood, Russell Taylor, 2023-09-30 The ten volume set LNCS 14220 14221 14222 14223 14224 14225 14226 14227 14228 and 14229 constitutes the refereed proceedings of the 26th International Conference on Medical Image Computing and Computer Assisted Intervention MICCAI 2023 which was held in Vancouver Canada in October 2023 The 730 revised full papers presented were carefully reviewed and selected from a total of 2250 submissions The papers are organized in the following topical sections Part I Machine learning with limited supervision and machine learning transfer learning Part II Machine learning learning strategies machine learning explainability bias and uncertainty Part III Machine learning explainability bias and uncertainty image segmentation Part IV Image segmentation Part V Computer aided diagnosis Part VI Computer aided diagnosis computational pathology Part VII Clinical applications abdomen clinical applications breast clinical applications cardiac clinical applications dermatology clinical applications fetal imaging clinical applications lung clinical applications musculoskeletal clinical applications oncology clinical applications ophthalmology clinical applications vascular Part VIII Clinical applications neuroimaging microscopy Part IX Image guided intervention surgical planning and data science Part X Image reconstruction and image registration

*Survival Guide to Midwifery E-Book* Diane M. Fraser, Margaret A. Cooper, 2012-06-15 Perfect for practice placement this handy Survival Guide gives you the clinical information you need at your fingertips Pocket sized guide to midwifery High level summary of the clinical content needed for practice Concise bullet point style for quick reference Section on anatomy Great revision aid Pocket sized guide to midwifery High level summary of the clinical content needed for practice Bullet pointed for quick reference Section on anatomy Great revision aid Perinatal Mental Health chapter updated from confidential enquiries into maternal deaths findings and recommendations applied to practise New appendix on An aid to calculations in midwifery practice helps students to calculate correct doses of medicines and intravenous infusions Illustrations improved to enhance clarity of understanding More compact size makes it easier to carry around Archives of Pathology & Laboratory Medicine ,2008

**Fetal Heart Rate Monitoring** Roger K. Freeman, Thomas J. Garite, Michael P. Nageotte, Lisa A. Miller, 2012-09-26 Fetal heart rate monitoring affects the lives of millions of women and infants every year in the United States alone Used by all members of the obstetric team nurses students midwives and physicians it is the primary method to assess fetal oxygenation in both the antepartum and intrapartum setting Improving outcomes and promoting patient safety depends upon correct use and interpretation of fetal heart rate monitoring and is crucial to daily obstetric practice This fourth edition provides the obstetrical team a framework within which to interpret and understand fetal heart rate tracings and their implications The text covers key issues as the physiological basis for monitoring a discussion of fetal hypoxemia and neonatal encephalopathy instrumentation and pattern recognition In addition to an in depth review of the standardized NICHD nomenclature and three tiered FHR Category approach there are chapters on

intrapartum and antepartum management as well as fetal central nervous system effects on monitor patterns Since fetal monitoring is primarily a screening tool there are also discussions on the use of backup methods for evaluation of abnormal patterns This 4th edition also brings the addition of Lisa A Miller CNM JD who provides a nursing and midwifery perspective as well an enhanced legal and risk management review This new fourth edition includes Review of neonatal encephalopathy and recent studies on CP Current information and discussion of most recent NICHD panel recommendations both antepartum and intrapartum New chapter on Pitfalls in EFM Detailed chapter on risk management liability documentation New section on fetal maternal hemorrhage Update on new instrumentation Crucial information on maternal fetal coincidence and FDA warnings All chapters include updated practice tips and clinical implications for the entire obstetric team Plus with this edition clinicians have access to a companion website with full text and an image bank for fast simplified clinical review

**Sudden Death in the Young** Roger W. Byard, 2010-09-16 Highly illustrated complete overview of pathological aspects of sudden death in the young from before birth to middle adult life

**Pathology of the Human Placenta** Kurt Benirschke MD, Professor Dr med Peter Kaufmann, 2013-03-14 Most obstetricians and pediatricians would agree that the examination of the placenta often helps to explain an abnormal neonatal outcome As early as in 1892 Bal lantyne wrote that A diseased foetus without its placenta is an imperfect specimen and a description of a foetal malady unless accompanied by a notice of the placental condition is incomplete Deductions drawn from such a case cannot be considered as conclusive for in the missing placenta or cord may have existed the cause of the disease and death During intrauterine life the foetus the membranes the cord and the placenta form an organic whole and disease of any part must react upon and affect the others Similar thoughts were succinctly detailed in Price s discussion of his concept of the prenatal biases as they affected twins His contribution also admonishes us that placental study is a sine qua non for a more perfect understanding of fetal development 1950 Despite all this understanding of the past and appreciation for placental disease great resistance still exists to performing the task of placental examination routinely For many pathologists therefore the placenta has remained a mysterious organ

**Pathology of the Human Placenta, 5th Edition** Kurt Benirschke, Peter Kaufmann, Rebecca N Baergen, 2006-11-17 Pathology of the Human Placenta remains the authoritative text in the field and is respected and used by pathologists and obstetrician gynecologists alike This fifth edition reflects new advances in the field and includes 800 illustrations 173 of them in color The detailed index has been improved and the tables updated Defined terms are highlighted in bold for easy identification and further findings are discussed in small type throughout each chapter Advances in genetics and molecular biology continue to make the study of the placenta one of vast diagnostic and legal importance

**Myles Survival Guide to Midwifery** Maureen D. Raynor, Christine Catling, 2017-03-15 New edition of the hugely popular Survival Guide to Midwifery originally created in response to student requests for quality assured dip into information designed for use in the clinical environment The latest edition is fully updated throughout and has new authorship from the UK and



Australia Helpful bullet point style allows rapid access to essential information Useful revision guide for examinations and assessments Contains common abbreviations medications drug calculations glossary of common terms and normal values Thoroughly revised to reflect key developments in current midwifery practice Now includes further reading and useful website addresses Pathology of the Human Placenta Kurt Benirschke, Peter Kaufmann, 2013-06-29 Completely reorganized a practical how to guide to placental examination plus the most authoritative reference available on all aspects of the normal and abnormal placenta New chapters have been added on Normative Values and Tables Microscopic Survey and Histopathological Approach to Villous Alterations More extensive indexing help meet the daily demands of both the novice and experienced placental pathologists **Williams Obstetrics 24/E (EBOOK)** Marlene M. Corton, Kenneth J. Leveno, Steven L. Bloom, Barbara L. Hoffman, 2014-05-06 The premier reference in obstetrics for more than a century now even more relevant to today's practice Williams Obstetrics is the most detailed comprehensive and rigorously referenced text on the subject Written by an author team from the world renowned Parkland Hospital the hallmarks of this classic are its thoroughness scientific basis and practical applicability for the obstetrician at the bedside This edition of Williams Obstetrics continues to emphasize the scientific based underpinnings and evidence based practices of the specialty This is accomplished by using incorporating more than 3 000 new literature citations and guidelines from the most trusted professional and academic organizations One of the important features of the twenty fourth edition is a greater focus on the fetus as a patient and an expanded discussion of fetal diagnosis and therapy This is complemented by more than 100 new sonographic and MR images of common fetal abnormalities A new reorganization of the text enables the book to highlight more effectively the myriad disorders that may complicate pregnancy Williams Obstetrics provides a convenient clinically relevant text of value to the busy practitioner The book summarizes important new data that has influenced evidence based management to improve pregnancy outcomes Much of this data is conveniently distilled into newly created tables and diagnostic and treatment algorithms During discussion numerous sources are cited to provide evidence based options for patient management Additionally nearly 900 images complement the text many of which are new or enhanced These include sonograms MR images photographs diagrams and graphs This edition of Williams Obstetrics continues to provide clinicians with everything they need to know about the practice of obstetrics with a level of authority and quality of presentation not found in any other resource

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