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BOOK REVIEW

Miller's Anesthesia, 9th edn, M. Gropper, L. Eriksson, L. Fleisher, J. Wiener-Kronish, N. Cohen and K. Leslie (editors), Elsevier Press, Philadelphia, PA, USA, 2019, pp. 3112. Price: £309.59. ISBN 9780323596046/9780323612630

At 2824 pages (not including indices and online content) and weighing approximately 10 kg, ***Miller's Anesthesia*** is a substantial book. It is not for light reading. With comprehensive and wide-ranging coverage of many topics, this book is designed to be the reference text for anyone who practises anaesthesia. The text (in two volumes, for ease of carriage and printing I presume) is meant to be applicable globally, although being a British anaesthetist I found it somewhat lacking in generalizing to British anaesthetic practices. This is reflected in the contributing authors list, which comprises of many notable figures in anaesthesia, but of the 230+ contributors to the textbook over 80% are from the US and only 9 are UK-based. This impacts significantly on the style of text and the approaches described to anaesthetic practice. This is evident in chapter 2, which is titled 'Global Anesthesia' but mentions very little about UK practice. This is a bit surprising given how robust UK training is and how pro-active UK anaesthesia is regarding data collection, clinical governance, and quality improvement projects. This may reflect an incongruity between the practice of anaesthesia of the US and the rest of the world.

That said, it is certainly a worthwhile read and reference text. With a retail price of around £300, one gets a vast amount of content. This includes 42 online videos illustrating various techniques ranging from echocardiography to nerve block, which complement the text well. Divided into eight sections, the first volume concentrates on the basics of anaesthesia, with the first section focusing on the more non-clinical/non-scientific aspects. In section II, the book gets to grips with the core science behind anaesthetics. Although described as a section on 'Anesthetic Physiology', the coverage is far wider, encompassing anatomy, biochemistry, and pharmacology where relevant.

The style of writing is predictably variable. All of the chapters follow a basic structure: a 'Keypoints' box (which can be over a page long), an introduction and then the bulk of the text, followed by references in the text. Diagrams, figures and photos are present in all chapters to a greater or lesser extent. Tables and boxes are also utilised to distil key facts or relevant information. Most chapters are formatted in a similar way and are well cross-referenced to relevant information in other chapters. That said, Chapters 6 & 7, for example, are in a different format and style to other chapters, using different fonts, bold-type subheadings and spacing. This can make it slightly less comfortable to read compared with other chapters.

The 9**th** edition of ***Miller's Anesthesia*** certainly has been updated to include relevant and new materials. References dated as recent as 2018 have been included in the text. The information provided is backed up with recent research and as such is well grounded. In some chapter revisions the authors mainly added to the text rather than alter/revise it. This may explain some of the repetition that is observed in some chapters. For example, in Chapter 12 (Neuromuscular Physiology And Pharmacology), the authors proceed to discuss the role of potassium channels on nerve terminals and how they limit entry of Ca^{2+} during depolarization. However, they do this twice, almost ***ad verbatim***, on the same page. In the same chapter, there are also mistakes (labelling acetylcholine vesicles VP1 and VP2 as releasable and reserve pools in the text, when it is in fact the other way round, as they describe later on). This does not instil confidence in the proof-reading of the revised edition. Additionally, on page 340, the text refers to botulinum toxin, but figures 12.3D and E refer to it as clostridial toxin. These are the same, but add an unnecessary layer of complexity to an already detailed read. Furthermore, the discussion of pharmacology could be improved in this chapter. The authors discuss agonism and antagonism, without mentioning allosteric binding or inverse agonism (though do discuss the drug flumazenil, which is an inverse agonist). One would like to see a more thorough description where relevant.

The second volume covers the more advanced/subspecialist areas related to the practice of anaesthesia. The range of subjects covered is broad and deep, lending credence to an already established reference textbook. I particularly liked the fact that the discussions included both a scientific and clinical aspect in most of the chapters. In Chapter 54 (author: insert title here), the use of applied physiology was well done,

including flow-volume loops to illustrate the pathophysiological changes and that impact on cardiac output and anaesthesia.

In reading Chapter 57 (Anesthesia for Neurologic Surgery and Neurointerventions), I very much enjoyed the flow and considerations for various aspects related to perioperative neurosurgical practice. That said, the authors may have overcomplicated certain issues. Table 57.1, for example, which is a table that details the Monroe-Kellie doctrine, could be described simply in a few lines. As with all aspects of clinical practice, there is variance in how clinicians proceed (indeed, the elimination of variance is one aspect of LEAN methodology, mentioned in Chapter 5, as a method of reducing waste and improving quality of care). The authors describe the use of nitrous oxide in neurosurgery where intracranial pressure is not persistently raised. This is at variance with standard practice in the UK, where nitrous oxide would not be used in any intracranial surgery due to risk of pneumocephalus in the postoperative period. Whether this variance is due to the authors aiming for a global market or whether they believe this to be best practice is not conveyed. Additionally, the authors advocate use of thiopentone infusion over propofol infusion for reduction of cerebral metabolic rate, especially in the ICU setting, citing lack of evidence for propofol as a superior agent and the effects of propofol infusion syndrome. That said, the context-sensitive half-times of thiopentone and propofol have not been considered in the authors' evaluation, which may have a significant impact on emergence and complications.

Overall, the 9**th** edition of ***Miller's Anesthesia*** is a well-referenced, comprehensive textbook that will likely address any queries a discerning reader may have. The online version is easier to read, better spaced and more accessible than the print version. This textbook should be available in all medical libraries with a section on anaesthetics, but I would hesitate paying £300 for it to sit in my personal library at home. Whilst overall it is a comprehensive reference text, given its cost and its marketing as a 'global text' I think further efforts could be made to reduce variance, reduce errors, and include more countries, thereby reaching a wider audience.

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