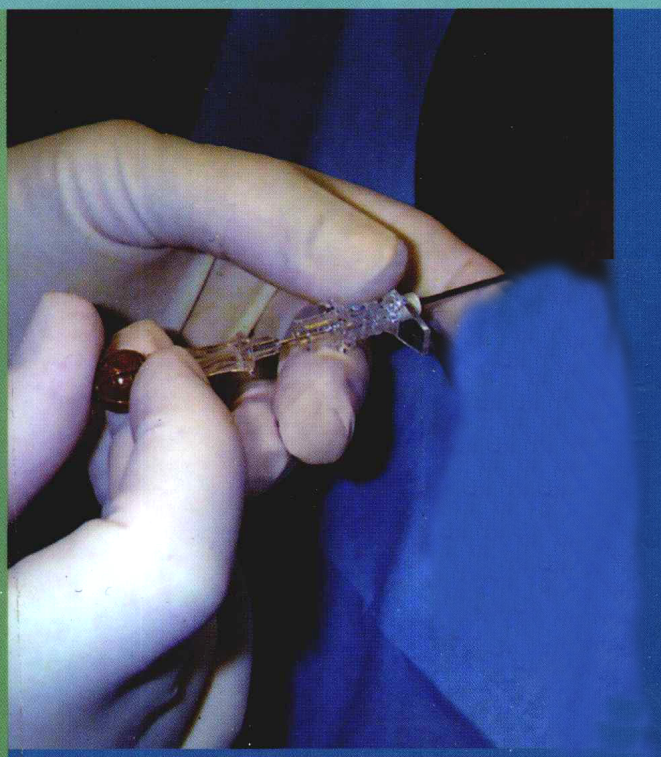
实用产科麻醉

A Practical Approach to Obstetric Anesthesia



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人民卫生出版社

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By Brenda A. Bucklin, et al.

实用产科麻醉
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图书在版编目（CIP）数据

实用产科麻醉/黄宇光主译. —北京：人民卫生出版社，2010.12
ISBN 978-7-117-13720-1

Ⅰ.①实… Ⅱ.①黄… Ⅲ.①产科外科手术-麻醉学 Ⅳ.①R719

中国版本图书馆 CIP 数据核字（2010）第 214829 号

门户网：www.pmph.com	**出版物查询、网上书店**
卫人网：www.ipmph.com	**护士、医师、药师、中医师、卫生资格考试培训**

图字：01-2010-1854

实用产科麻醉

主　　译： 黄宇光
出版发行： 人民卫生出版社（中继线 010-59780011）
地　　址： 北京市朝阳区潘家园南里 19 号
邮　　编： 100021
E - mail： pmph @ pmph.com
购书热线： 010-67605754　010-65264830
　　010-59787586　010-59787592
印　　刷： 三河市宏达印刷有限公司
经　　销： 新华书店
开　　本： 787×1092　1/16　**印张：** 32　**字数：** 747 千字
版　　次： 2010 年 12 月第 1 版　2010 年 12 月第 1 版第 1 次印刷
标准书号： ISBN 978-7-117-13720-1/R·13721
定　　价： 78.00 元
打击盗版举报电话：010-59787491　E-mail：WQ @ pmph.com
（凡属印装质量问题请与本社销售中心联系退换）

敬　告

本书的作者、译者及出版者已尽力使书中的知识符合出版当时国内普遍接受的标准。但医学在不断的发展，随着科学研究的不断探索，各种诊断分析程序和临床治疗方案以及药物使用方法都在不断更新。强烈建议读者在使用本书涉及的诊疗仪器或药物时，认真研读使用说明，尤其对于新产品更应如此。出版者拒绝对因参照本书任何内容而直接或间接导致的事故与损失负责。

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本着忠实于原著的精神，译者在翻译时尽量不对原著内容做删节。然而由于著者所在国与我国的国情不同，因此一些问题的处理原则与方法，尤其是涉及宗教信仰、民族政策、伦理道德或法律法规时，仅供读者了解，不能作为法律依据。读者在遇到实际问题时应根据国内相关法律法规和医疗标准进行适当处理。

产科麻醉实践

从简介手册到百科全书式的著作，目前关于产科麻醉的书籍并不少见。然而缺少这样的参考书：对于有经验的临床医师和初学者管理普通的或有复杂病情的产妇都同样适用的，介于简单的指导手册和专著之间，同时涉及生理学及药理学临床处理原则的产科麻醉书籍。通过收集和整理在产科临床麻醉工作中得到的许多最新的数据信息，我们认为《产科麻醉实践》这本书达到了这个目的。

这是一本实用有益的参考书，通过大纲的形式提供了简便易查的内容。本书内容分为六部分：药理和生理、产前评估、产程和分娩、产后问题、疾病状态和各国立组织机构的有关指南。本书将相关内容分为三十一章，每章亦附有相关的参考文献。

本书的完成仰赖 40 多名编者的参与和辛苦工作，以及 Lippincott Williams and Wilkins 工作人员的付出。

作者

致　谢

我深深感谢对我追求医学事业给予鼓励、支持和才智的父母 Willis 和 Genevieve，也深深感谢我丈夫 Ulrich Klein 对我的爱、支持和无尽的耐心，最后我要感谢科罗拉多大学丹佛健康科学中心麻醉科主任 Thomas K. Henthron 和同事们对我完成这项工作所提供的时间和鼓励。

Brenda A. Bucklin

谨以此书纪念我的父亲 Gordon，并感谢我的妻子 Kimberley、我的孩子 Carwyn、Jake 和 Samantha 以及我的母亲 Sadie 对我的爱与支持。

David R. Gambling

感谢我产科麻醉的导师 Patrick Gibson 和 Mieczyslaw Finster 医生，他们教会我怎样同时做一名医生和研究者；感谢永远让我感到骄傲的 Joe 和 BenWlody；感谢 Charlotte，原因无尽。

David Wlody

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目　录

I 药理和生理

第一章　妊娠期的生理变化

正常情况下，妊娠期各器官系统发生显著的生理改变以满足不断生长的子宫、胎儿和胎盘的代谢需要。由于这些改变对于产妇的麻醉管理有着显著影响，因此，了解这些改变对于产科麻醉医师至关重要。此外，这些生理变化对已有的病理生理也会有显著影响。

本章首先讨论妊娠期的生理变化，探讨这些变化对麻醉管理和孕妇常见病的影响。

Ⅰ. 中枢神经系统

A. 吸入麻醉剂和肺泡气最低有效浓度

1. 以肺泡气最低有效浓度(MAC)作为测量指标，孕妇对常用的吸入麻醉剂的需要量比非妊娠状态降低 30%。[1]

这种降低的可能机制包括：

a. 血浆内啡肽水平增加。[2]

b. 孕酮水平增加(妊娠晚期升高达到 10～20 倍)，孕酮对中枢神经系统有抑制作用。[3]

2. 这一点非常重要，因为适于非妊娠孕妇的吸入麻醉药浓度用于孕妇时可能造成效能过强。例如，剖宫产手术实施椎管内麻醉时，辅助吸入氧化亚氮的浓度达 50%即可使孕妇的意识消失。

3. 孕妇对静脉诱导药物[4](如硫喷妥钠)和镇静剂(如地西泮)也有类似的敏感性增加现象。

B. 椎管内麻醉 足月妊娠时局部麻醉药的需要量减少约 40%。这一变化与两种机制有关。

1. 机械变化 增大的子宫压迫下腔静脉导致硬膜外静脉丛扩张。[5,6]这使硬膜外腔容量和每节段的脑脊液容积减少。因此，同样剂量的局部麻醉药硬膜外或者鞘内给药时，麻醉节段扩散更为广泛。

2. 生化变化 在早孕末期孕妇对局部麻醉药需要量就会减少，这远在硬膜外静脉发

生显著扩张之前。这一现象提示可能存在某种生化或激素机制。

a. 将雄性兔长期暴露于孕酮后，在体外实验中阻滞其迷走神经传导所需局部麻醉药的浓度降低。[7]

b. 短期暴露于孕酮的雄性兔的迷走神经会出现这一效应。[8]

c. 这提示长期暴露于孕酮引起神经膜蛋白通道的改变导致对局部麻醉药的敏感性增强。

d. 循环内 β-内啡肽增加和脊髓内激活的 κ-阿片受体增加使妊娠期和分娩期疼痛的耐受性增强。[9]

Ⅱ. 呼吸系统

A. 耗氧量（表 1.1）

1. 增大的子宫及胎盘和胎儿的高代谢需求使整个妊娠期耗氧量增加，到妊娠足月时，耗氧量比妊娠前增加 40%～60%。[10]

表 1.1　妊娠期耗氧量增加的因素

妊娠期耗氧量增加 40%～60%的原因	胎盘
代谢需求增加	呼吸做功增加
胎儿	心脏做功增加
子宫	

2. 呼吸暂停时（如麻醉诱导或子痫发作）氧饱和度下降速度更快。肺容积的改变可以增强这一效应。最近的一项研究中，作者使用模拟的快速序贯诱导后的生理变化对孕妇的呼吸暂停耐受性降低进行了研究。[11]作者发现，去氮达 99%后，孕妇氧饱和度下降至 90%的时间为 4 分钟，而非孕妇需 7 分 25 秒。另外，氧饱和度从 90%下降至 40%的时间，孕妇为 35 秒，非孕妇为 45 秒。

B. 动脉血气

1. 孕酮使呼吸中枢敏感化，从而对二氧化碳的呼吸反应增强。[12]潮气量和呼吸频率增加导致妊娠期过度通气。最近的研究表明，孕妇的过度通气是妊娠导致的觉醒和呼吸的中枢化学驱动、酸碱平衡、代谢率和脑血流改变的结果。[13]这可以解释为什么孕妇 $PaCO_2$ 通常为 30～32mmHg（表 1.2）。然而由于尿内碳酸氢盐排泄增加（妊娠期通常为 20mmHg），pH 得以部分校正，通常为 7.41～7.44。[14]

表 1.2　妊娠期血气分析

	非妊娠	妊娠分期		
		早期	中期	晚期
pH	7.40	7.41～7.44	7.41～7.44	7.41～7.44
PaO_2 mmHg	100	107	105	103
$PaCO_2$ mmHg	40	30～32	30～32	30～32
$[HCO_3^-]$ mmol/L	24	21	20	20