模块 III

模块的目标

EB（杰出气管镜专家）的读者不应该将其中的模块测试图看呈单纯一种测试，因为无论您是否或能否回答这些这些问题，读了这些内容，您都可以从中获得非常有用的信息。也许您会发现：有些问题的正确答案不止一个，这也许是一个善意的陷阱，而读者不应该将其看做是一种陷阱，而应该看做是帮助读者去思考某个问题的方式。一个模块含有 30 个问题及答案，您大概需要 2 小时去完成。当您完成后，您就可以去看考试后的内容，其包含 10 个多项选择题，主要针对每个模块中所包含知识的基础原理。针对每个问题，您也许只能在答案部分或图示部分找到答案的相关信息，但不能直接找到答案。只有在您阅读完考后的内容并准备进入下一级模块之前，您才能对您的答卷给出一个 100%准确率的判断。

杰出的支气管镜专家

EB 最初开设的主要目的是为了对支气管镜相关的理论知识进行学习。每个模块包含的有关支气管镜的知识由易到难呈阶梯状，线性学习及学习左右脑信息处理的最佳结合，而且最重要的是，使学习者在学习中得到乐趣，无论何种专业人员，都能将所学的知识应用到实践中对患者的关怀。

EB 为学习支气管镜相关的理论知识提供了一个标准化途径，适合用于现在的医学教育中本科生教育及研究生教育。标准化的问题-答案模式及与模拟支气管的示例图、技术图，能使学习者能够得到很多知识及启发。一个 100%准确的答卷及考后的内容回顾能使学者基本掌握每个模块中的知识点。

经过的 EB 理念的熏陶及多年支气管镜检查的经验，精英的支气管镜专家不仅获得了扎实的基础知识，并且积累了丰富的个体化经验，但并非教条的知识模式及习惯。“一个认为他一切都懂的人其实什么都不懂”的教育理念使杰出的支气管镜专家既有自信，又不断地探索新知识，打破旧传统，开辟新天地。

感谢李时悦教授团队，包括陈愉大夫、陈小波大夫、钟长镐大夫等各位所作出的贡献。

LEARNING OBJECTIVES TO MODULE III

IMPORTANT NOTE

Readers of The Essential Bronchoscopist© should not consider this module a test. In order to most benefit from the information contained in this module, every response should be read regardless of your answer to the question. You may find that not every question has only one "correct" answer. This should not be viewed as a trick, but rather, as a way to help readers think about a certain problem. Expect to devote approximately 2 hours of continuous study completing the 30 question-answer sets contained in this module.

When you are ready, you may choose to take the post-test. This ten multiple choice question test addresses specific elements of the learning objectives of each module. Questions pertain to information found in the answer paragraphs or figures in the module, but may not correspond directly with a question found in the module. A 100% correct answer score is expected on the post-test before readers can advance to the next module. If even one of your answers is incorrect, you must go back to the beginning of the post-test, and begin the entire test all over again. You may print out your test scores by hitting "print screen" on your monitor.

At the conclusion of this module, the learner should be able to:

1. Compare and contrast at least THREE maneuvers used when difficulty is encountered during intubation over the flexible bronchoscope.
2. Define the term "scattered radiation"
3. List at least THREE disadvantages of Glutaraldehyde disinfection.
4. Identify the Ovassapian oral intubating airway and list its advantages as compared to other oral airways.
5. List and describe various descriptive terms of airway mucosal abnormalities.
6. Describe a tracheal abnormality in relation to normal anatomic airway structures.
7. Describe different appearances of tracheobronchial secretions.
8. List at least THREE adverse effects related to bronchoalveolar lavage.
9. Compare and contrast the use of opiates with other drugs administered for conscious sedation.
10. Describe a systematic approach to bronchoscopic inspection and diagnosis.

模块 III 的学习目的

重要提示：

Essential Bronchoscopist©的读者不应该把这个模块作为考试。为了从这个模块里的内容中受益，每个人在阅读模块内容的时候都不要看问题的答案。你可能发现每个问题都有唯一的"正确答案"不要把这个当成一个考试，而应该是一个帮助读者思考问题的机会。希望可以花大约 2 小时时间左右的连续学习，完成这个模块的 30 个问题。当你准备好以后，你可以做测试后练习，这里有针对这个模块学习目标的

特殊知识点设计的 10 个多选题，问题的答案信息在模块的答案部分和图示里可以找到，但是不能在模块里直接找到答案。
读者进入下一个模块的之前，必须完全答对全部的测试后习题。即使你有一道题答错了，你也应该重新把模块学习一次，再重新做练习。你可以在屏幕上按”打印屏幕“把你的测试成绩打印出来。
在模块结束的时候，学习者应当能够
1、对比至少 3 个用纤支镜引导下气管插管遇到困难是可以应用的手法。
2、知道“散射”的定义
3、知道用“戊二醛”消毒的三个缺点。
4、认识 Ovassapian 经口插管气道，而且列出它相对其他气道的优点。
5、描述多种气道黏膜病变的名词。
6、对比正常气道结构来描述气管异常
7、描述不同气道分泌物的外观形态
8、列出支气管肺泡灌洗至少 3 个不良反应
9、比较阿片类药物和其他药物在清醒状态下镇静的用法
10、 有系统地介绍支气管镜检查和诊断的方法

Created on 7/26/2002 1:17:00 PM

Question III.1: All of the following are potential causes of confusion and seizures in an elderly man undergoing bronchoscopic biopsies of a large right upper lobe mass **except**.

A. Silent brain metastases from bronchogenic carcinoma
B. Hydration and paraneoplastic inappropriate SIADH-like syndrome
C. Lidocaine toxicity
D. Midazolam toxicity
E. Methemoglobinemia

问题 III.1

以下几项除了哪一项以外均是一个老年人行右上叶大肿块支气管镜活检时出现意识障碍或癫痫发作的潜在原因

A 无症状的肺癌脑转移

B 副癌综合征中的抗利尿激素分泌异常综合征或水代谢异常

C 利多卡因中毒

D 咪唑安定中毒

E 高铁血红蛋白症

Question III.2: During intubation over the flexible bronchoscope the endotracheal tube can become caught on laryngeal structures and not enter into the trachea. All of the following maneuvers are warranted **except**.

A. Partially withdrawing the endotracheal tube over the bronchoscope, rotating it 90 degrees clockwise and readvancing the tube.
B. Partially withdrawing the endotracheal tube over the bronchoscope, rotating it 90 degrees counter-clockwise and readvancing the tube.
C. Changing from a small 4.8mm diameter bronchoscope to a larger 6 mm diameter bronchoscope
D. Withdrawing the endotracheal tube over the bronchoscope and repeating multiple attempts at intubation

问题 **III.2**

用软式支气管镜引导的气管插管在通过喉头部分时会引起咳嗽，因此导致镜身及气管导管无法进入，以下各项手法除了哪一项外都可以

A、将支气管镜和气管导管退出一部分，顺时针旋转 90 度后重新插入气管导管。

B、将支气管镜和气管导管退出一部分，逆时针旋转 90 度后重新插入气管导管。

C、用直径为 6mm 的支气管镜代替原直径为 4.8mm 的支气管镜。

D、把套在支气管镜上的气管导管全部退出，反复多次直接插管。

Question III.3: Fentanyl is a short acting opioid 100 times more potent then morphine. Its onset of action is within 2 minutes of intravenous injection. In addition, its maximum respiratory depression effect occurs

A. Immediately upon injection
B. Within 2-4 minutes after injection
C. 5-10 minutes after injection
D. 11-15 minutes after injection
E. More than 15 minutes after injection

III.3 芬太尼是一种短效的阿片类药物，效价是吗啡 100 倍；在静脉注射 2 分钟后开始起效，芬太尼最大的呼吸抑制作用发生在

A 注射后马上发生

B 注射后 2-4 分钟发生

C 注射后 5-10 分钟发生

D 注射后 11-15 分钟后发生

E 注射后 15 分钟后发生

Question III.4: All of the following statements about Naloxan (Narcan) are true **except**

A. It reverses all effects and side effects of narcotics including sedation, respiratory depression, apnea, and pain control.
B. Standard practice is to dilute 1 ampoule (0.4 mg or 1 ml) in 10 ml volume to make 0.04 mg/ml.
C. In order to reverse respiratory depression and apnea, 1 ml of dilute solution (0.4 mg) is injected intravenously every 2-4 minutes until consciousness is regained.
D. In the intensive care unit or on the ward, it is best to immediately administer the entire ampoule (0.4 mg) if the patient is severely respiratory depressed and if expert airway management is not available.
E. No more than 5 ml total should be administered because of risk of narcotic withdrawal.

III.4:以下关于纳洛酮说法哪一项是错误的。

A 它可以对抗包括镇静、呼吸抑制、呼吸困难、和止痛等麻醉剂的所有作用和副作用。

B 标准的配剂量方法是用 10 毫升的溶剂稀释 1 支（0.4mg 或者 1ml）纳洛酮，配成 0.04mg/ml 的浓度。

C 为了对抗呼吸抑制和呼吸困难，每 2-4 分钟静脉注射 1ml（0.04mg）稀释溶液，直到意识恢复。

D 在 ICU 或者病房，如果患者已经严重呼吸抑制或者没有专人进行气管插管等处理时，最好马上注射 1 安倍的剂量（0.4mg）

E 注射总剂量不要超过 5ml，因为这样有麻醉效果消失的危险。

Question III.5 Bronchoscopy is performed in a patient with cough and partial unilateral atelectasis. Based on the findings shown below, bronchoscopic examination should proceed with

A. Examination of the left bronchial tree, then inspection and biopsy of the lesion on the right.
B. Inspection and biopsy of the lesion on the right, then examination of the left bronchial tree.
C. Examination of the right bronchial tree, then inspection and biopsy of the lesion on the left.
D. Inspection and biopsy of the lesion on the left, then examination of the right bronchial tree.

Created on 5/5/2011 6:59:00 PM

问题 III.5 在一个咳嗽而且单侧肺部分不张。有如下图的发现，应当继续行什么纤支镜检查

A 检查左侧支气管树，然后检查右侧的损伤并取活检。

B 检查右侧的损伤并取活，然后检查左侧支气管树

C 检查右侧支气管树，然后检查左侧的损伤并取活检

D 检查左侧的损伤并取活，然后检查右侧支气管树

Question III.6: While intubating a patient over the flexible bronchoscope, it suddenly becomes difficult to advance the bronchoscope. Although you are able to see the vocal cords, it is impossible to advance the endotracheal tube over the bronchoscope. What happened and what should you do next?

A. The bending tip of the bronchoscope broke. You remove the bronchoscope from the endotracheal tube.
B. The tip of the bronchoscope has accidentally passed through the Murphy eye of the endotracheal tube. You remove the scope and the tube together as an ensemble.
C. The polyurethane covering of the bronchoscope has slipped and intussuscepted over itself, occluding the endotracheal tube lumen. You remove the bronchoscope from the endotracheal tube.
D. The tip of the bronchoscope is flexed too much and the endotracheal tube is caught in the aryepiglottic fold. You partially withdraw the endotracheal tube over the bronchoscope.

III.6: B

给患者用纤支镜引导下进行气管插管时，突然发生进镜困难，虽然你可以看到声带，但套在支气管镜上气管导管却不能进入，这是什么原因，需要怎么处理呢？

A 支气管镜的可弯曲头损坏了，应该把支气管镜从气管导管中取出。

B 支气管镜尖端经过气管导管的侧孔穿出，可以把支气管镜和气管导管一起取出。

C 覆盖在支气管镜上的聚氨基钾酸酯滑脱并叠套，堵塞了气管导管腔，应该从气管导管内取出支气管镜。

D 支气管镜头过度弯曲而且气管导管碰到杓会厌皱襞，你应当把气管导管从支气管镜上部分退出。

Question III.7: Glutaraldehyde is frequently used for bronchoscope disinfection. All of the following side effects can be noted in persons exposed to this chemical **except**

A. Headache
B. Conjunctivitis
C. Dermatitis
D. Asthma-like symptoms
E. Diarrhea

III.7 戊二醛常用于支气管镜消毒，患者接触这种化学品后，发生的副作用下述除了那一项外都可以出现？

A 头痛

B 结膜炎

C 哮喘样症状

D 腹泻

Question III.8: All of the following statements pertaining to bronchoscope cleaning and disinfection are correct **except**.

A. High-level disinfection with 2% Glutaraldehyde for 45 minutes inactivates all fungi, viruses, and vegetative organisms.
B. High-level disinfection with 2% Glutaraldehyde for 45 minutes will not inactivate all bacterial spores.
C. Video bronchoscopes with a distal CCD chip are more likely to be damaged by Glutaraldehyde disinfection than fiberoptic bronchoscopes.
D. A positive leak test can indicate damage to the proximal polyurethane or distal rubber sheath of the insertion tube, or rupture of the integrity of the working channel of a flexible bronchoscope.

III.8 以下除了哪一项外均为清洗和消毒支气管镜的正确方法。
A 用 2%戊二醛浸泡 45 分钟灭活所有真菌、病毒、和有活力的病原微生物进行**高规格的消毒**
B 用 2%戊二醛浸泡 45 分钟的**高规格的消毒不能灭活所有的细菌芽孢。**
C 电子支气管镜的末端感光（CCD）元件比纤维支气管镜更容易被戊二醛浸泡消毒损坏
D 正泄漏实验可以发现（气管镜）管体近端的聚氨基甲酸乙酯或者远端的橡胶套，或者纤维支气管镜工作部分部分有破裂。

Created on 5/5/2011 6:59:00 PM

Question III.9: During fluoroscopy, x-rays that pass though the patient and strike the image detector or fluoroscopic screens is called

A. Scattered radiation
B. Remnant radiation
C. Primary radiation

III.9 在 X 线透视下进行（纤支镜操作时），射线穿过患者后感应到成像探测器，这个过程叫做：
A 散射
B 衰减
C 辐射

Question III.10: While using fluoroscopy, scatter of radiation is increased when

A. Allied voltage (kVp) is decreased
B. Wavelength is decreased
C. Tissue density is decreased
D. Tissue thickness is increased

III.10:在使用 X 光设备时，什么时候散射会增加。
A 电压(kVp)减少
B 波长减少
C 组织密度减少
D 组织厚度增加

Created on 5/5/2011 6:59:00 PM

Question III.11: Which of the following might prompt you to carefully reexamine the indications for bronchoscopy in the intensive care unit of your institution

A. Bronchoscopy is frequently performed in critically ill patients with copious secretions and elevated airway pressures while on mechanical ventilation
B. Bronchoscopy is frequently performed in critically ill patients without radiographic evidence of atelectasis, and has not prompted significant changes in medical management
C. Bronchoscopy is frequently performed in critically ill patients with new onset of hemoptysis
D. Bronchoscopy is frequently performed in critically ill patients with new or persistent radiographic pulmonary infiltrates despite use of empiric antibiotics

III.11:以下哪一情况会使你在你所在医院的 ICU 里仔细的重新考虑你的支气管镜的适应症

A 经常在有很多分泌物而且在机械通气过程中气道压上升的重症患者中使用支气管镜。

B 经常在没有肺不张的影像学证据，而且没有发生明显的医疗处理改变的重症患者中使用支气管镜。

C 经常在于新近咯血的重症患者使用支气管镜

D 经常在虽然经验性使用抗生素，但是仍有新近出现或者持续的肺渗出改变的影像学证据的重症患者中使用支气管镜。

Question III.12: Which of the following intubation-oral airways will most likely allow adequate visualization of the larynx and vocal cords, even if the airway is inserted too far?

A. Berman pharyngeal airway.
B. Williams airway intubator.
C. Ovassapian airway

III.12 以下哪种情况下最可能，即使在进入气道很深的时候，仍允许足够的咽喉和声门视野？

A Berman 咽喉气道
B Williams 气道插管器
C Ovassapian 气道

Created on 5/5/2011 6:59:00 PM

Question III.13: You are about to describe a tracheal abnormality to a surgeon. In which of the following might she be most interested

A. Distance of the abnormality from the carina
B. Whether the abnormality has a wide or narrow base
C. Location of the abnormality in relation to the bronchial wall
D. Size of the abnormality (length, diameter, degree of airway obstruction)
E. Distance of the abnormality from the inferior margin of the vocal cords

III.13:你要向外科医师描述一个气管（异常）病变，以下什么东西是她最感兴趣的。
A（异常）病变与隆突的距离
B 病变是否有宽或者窄的基底。
C 病变的大小
D 病变与声门下缘的距离。

Created on 5/5/2011 6:59:00 PM

Question III.14: A 76-year-old patient with chronic cough, difficulty swallowing and new onset hoarseness is referred for bronchoscopic evaluation. 1 mg of Midazolam is injected intravenously and abundant topical anesthetic is applied to the oropharynx and larynx. The vocal cords move normally, but a firm lesion resembling adenoid cystic carcinoma obstructing 20 percent of the subglottis is seen. Because of the lesion's proximity to the vocal cords, no biopsies are obtained. About one hour after the procedure the patient develops a bluish discoloration of the lips. Arterial oxygen saturation decreases from 98 percent to 88 percent despite administration of supplemental oxygen. The patient has become anxious and combative in the recovery area. Resting heart rate increases to from 110 to 150. The most likely cause for this patient's symptoms is.

A. Cetacaine spray induced methemoglobinemia
B. Procedure-induced laryngospasm
C. Tetracaine toxicity
D. Myocardial infarction from prolonged hypoxemia
E. Lidocaine toxicity

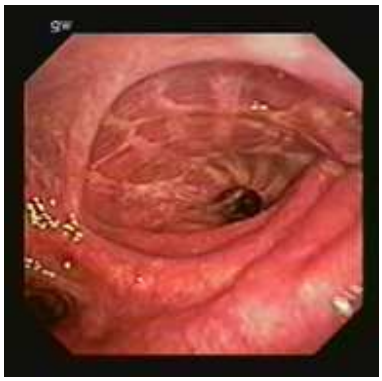
III.14 一个 76 岁慢性咳嗽患者，有吞咽困难，而且新近出现了声嘶，需要支气管镜检查，1 毫克的咪达唑仑（咪唑安定？）静脉注射，而且口咽和喉头给予充足的局部麻醉。（气管镜下）见声带活动正常，但是发现一个类似囊腺瘤的硬肿块阻塞了声门下 20%。由于肿物离声门比较近，取不到活检。检查后一小时，患者出现口唇紫绀，虽然给予了氧疗，但是动脉氧饱和度还是从 98%降到 88%，患者在观察室表现得焦虑和烦躁不安。静息时心率增加到 110-150 次/分，这个患者的症状的最可能的原因是

A 西他卡因喷雾（局部浸润）引起的高铁血红蛋白症
B 操作过程引起的喉痉挛
C 丁卡因中毒
D 持续的缺氧引起的心肌梗塞
E 利多卡因中毒

Created on 5/5/2011 6:59:00 PM

Question III.15: Tracheomalacia is defined as a loss of longitudinal elastic fibers of the posterior tracheal membrane with or without destruction or damage to tracheal cartilage leading to loss of rigidity and tracheal collapse. During an airway examination, which of the following is seen.

A. Collapse of the malacic intrathoracic segment during expiration and/or collapse of the malacic cervical segment during inspiration
B. Collapse of the malacic intrathoracic segment during inspiration and/or collapse of the malacic cervical segment during expiration
C. Collapse of the malacic intrathoracic segment during expiration and/or collapse of the malacic cervical segment also during expiration
D. Collapse of the malacic segment during expiration or inspiration with substantial inward movement of the pars membranosa



III.15 气管软化的定义是气管后方的弹性纤维消失，伴或不伴有气管软骨破坏，使到气管软化而塌陷。在（气管镜）气道检查时，（如果碰到上述病例）下面哪一项可以在检查中出现。
A 呼气相时胸内部分的（软化的）气道塌陷，而/或吸气相时（软化）气道的胸外部分塌陷。
B 吸气相时胸内部分的（软化的）气道塌陷，而/或呼气相时（软化）气道的胸外部分塌陷。
C 呼气相时胸内部分的（软化的）气道塌陷，而/或呼气相时（软化）气道的胸外部分也塌陷。
D 呼气相时软化部分塌陷，吸气相时正常粘膜的过度向内运动。

Question III.16: All of the following reasons for immediate intubation of the inhalation injury victim are correct **except**

A. Intubation before the development of significant airway edema and respiratory compromise avoids an emergency procedure, the outcome of which may be disastrous.
B. Burn-related chest restriction and circumferential neck burn related airway obstruction further reduces ventilatory flow.
C. Noted airway abnormalities such as soot, charring, mucosal necrosis, edema, and inflammation below the level of the carina antedate blood gas and radiographic changes suggestive of parenchymal injury.
D. Parenchymal damage is frequently delayed.
E. Maximum upper airway edema occurs within the first 24 hours after injury

III.16:下列哪一项不是吸入性损伤患者紧急插管的原因:
A 在出现严重的气道水肿前插管，建立人工气道可以避免一些紧急的，有可能导致严重后果的情况发生。
B 烧伤导致的胸部限制性（障碍），颈部环形的烧伤导致气道阻塞更导致气流减少。
C（紧急插管）通常可以延缓肺实质的损害
D 最严重的上气道水肿发生在损伤后的头 24 小时。

Question III.17: All of the following statements about inhalation injury in burn victims are correct **except**

A. The use of bronchoscopy for diagnosis has resulted in a recognized increase of the incidence of inhalation injury from a 2-15 percent incidence (based on history, carbonaceous sputum, and facial burns) to as high as 30 percent incidence.
B. When inhalation injury is present, mortality is greater than when cutaneous burns alone are noted.
C. Bronchoscopic findings consistent with inhalation injury in burn victims are usually airway edema, inflammation, or carbonaceous secretions (presence of soot).
D. Erythema, hemorrhage and ulceration rarely occur within the tracheobronchial tree.
E. Gaseous and particulate products of incomplete combustion are associated with the tracheobronchial injury of smoke inhalation.

III.17:以下哪一项关于烧伤患者吸入损伤的说法是错误的。
A 使用支气管镜检查会增加吸入损伤的发生率 2%-15%（这是基于病史、痰碳含量、脸部烧伤情况判断的）到最高 30%左右。
B 当发生吸入性损伤，死亡率 比单纯的皮肤烧伤高得多。
C 给烧伤患者行支气管镜检查时发现气道水肿、炎症、分泌物含碳量增加（黑色痰）都提示吸入性损伤。
D 红斑、出血、溃疡等表现很少发生在支气管树。

Question III.18 A 63-year-old man comes to your office because of a three-year history of dyspnea. He is short of breath with minimal exertion. Asthma was diagnosed one year ago. He is using inhaled bronchodilators and oral corticosteroids occasionally. Physical examination reveals mild stridor. Laboratory tests are normal. Chest radiograph and computed tomography scan of the chest reveal a 3 cm intraluminal mass narrowing the midportion of the trachea to 5 mm. There is no evidence of extraluminal tumor or enlarged mediastinal adenopathy. Flexible bronchoscopy confirms the presence of the 3 cm intraluminal mass in the midtrachea. Airway lumen is narrowed but adequate. Biopsy reveals adenoid cystic carcinoma. Which of the following would you recommend next

A. Referral to radiation oncology for external beam irradiation
B. Referral to medical oncology for systemic chemotherapy
C. Referral to interventional Pulmonology for Nd:YAG laser resection
D. Referral to thoracic surgery for sleeve resection of the trachea

III.18 一个 63 岁的老人因“呼吸困难 3 年”来找你看病。他稍为运动就会感到气短。诊断哮喘 1 年，正使用支气管扩张剂和偶尔口服糖皮质激素，听诊可闻及轻度的哮鸣音，实验室检查正常，胸片和胸部 CT 发现有 3cm 的气管腔内肿物使中段气管狭窄到只有 5mm，没有气管外肿瘤和纵膈淋巴结肿大的证据。支气管镜在中段气管发现 3cm 的管腔内肿物。气管腔虽然狭窄，但是仍足够（操作），活检发现囊腺样肿瘤，以下哪一步你觉得应该继续进行

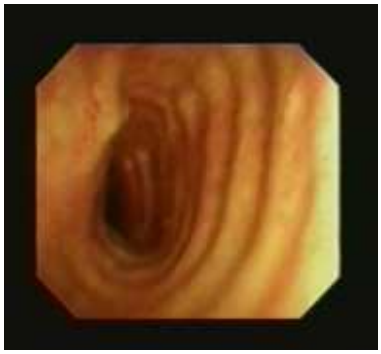
A 联系放疗科行放疗
B 联系肿瘤科行化疗
C 联系（肺）介入科行 Nd:行 YAG 激光切除
D 联系外科行气管“袖套样”切除术

Created on 5/5/2011 6:59:00 PM

Question III.19: It is most likely that the patient with this abnormal airway seen in the Figure has which one of the following disorders

A. Sarcoidosis
B. Relapsing polychondritis
C. Teratoma with extrinsic tracheal compression
D. Underlying chronic obstructive pulmonary disease
E. Pulmonary amyloidosis

III.19:如下图所示，患者的气道异常最可能属于哪一种疾病？
A 结节病
B 复发性多发性软骨炎
C 气管外畸胎瘤压迫气道
DCOPD
E 肺淀粉样变



Question III.20: You are asked to emergently bronchoscope a 33-year-old male in the intensive care unit. The patient has been intubated and mechanically ventilated for the past week. He was the victim of a motorcycle accident causing closed-head trauma and loss of consciousness. Respiratory therapy just noted fresh blood tinged secretions on suctioning. Some watery secretions and blood are in the endotracheal tube. The patient is hemodynamically stable, but hypertensive. Which of the following bronchoscopic appearances is most likely to account for this patient's problem?

A. Diffuse tracheobronchial erythema, purulent secretions, and tissue sloughing.
B. Diffuse swelling and erythema of bilateral airways.
C. Raised whitish plaques with surrounding erythema in the distal lower lobe bronchi.
D. Edema, erythema, and petechia in the right main bronchus and on the main carina.
E. Swollen airway mocosa and pink frothy secretions.

III.20： 你在 ICU 给一个 33 岁的男性行紧急气管插管，这个患者在上星期行气管插管然后机械通气。他是一个交通事故导致闭合性颅脑损伤而且已经丧失意识的患者，吸痰的时候发现气道分泌物有淡红色的鲜血。在气管导管发现一些水样的分泌物和血。患者血流动力学稳定，但是有高血压。以下哪一项支气管镜发现符合患者的病因。

A 弥漫性气管支气管红斑，浓性分泌物，组织脱落
B 弥漫性水肿和双侧支气管红斑
C 在下肺叶远端的支气管凸起的白斑伴有环绕的红斑
D 在右主支气管和隆突有水肿、红斑、瘀斑。
E 气道粘膜肿胀和粉红色泡沫分泌物

Created on 5/5/2011 6:59:00 PM

Question III.21: While performing a bronchoscopy in an adult patient with presumably normal airways, you ask the patient to inhale, exhale, and cough. Which of the following changes in airway anatomy would be abnormal

A. The tracheal length increased by 20 % (about) 1.5 cm) during normal inspiration
B. The tracheal transverse diameter decreased by 10% (about 2 mm) during normal expiration
C. The tracheal transverse diameter decreased by 30 % during cough
D. The tracheal sagittal diameter decreased to 30% during cough
E. The tracheal sagittal diameter decreased by 30 % during normal expiration

III.21:当给一个假定气道是正常成年人做支气管镜检查，你嘱患者吸气、呼气、咳嗽等，以下哪一项的气道解剖改变是不正常的。
A 在正常吸气时气管长度增加 20%（大概 1.5cm）
B 在正常呼气时气管横截面直径减少 10%（约 2mm）
C 在咳嗽过程中气道横截面直径减少大概 30%
D 在咳嗽过程中气道矢状面直径减少 30%
E 在正常呼气过程中气道矢状面减少 30%

Created on 5/5/2011 6:59:00 PM

Question III.22: All of the following "habits" can cause a bronchoscopist to miss a diagnosis or inadvertently harm a patient **except**.

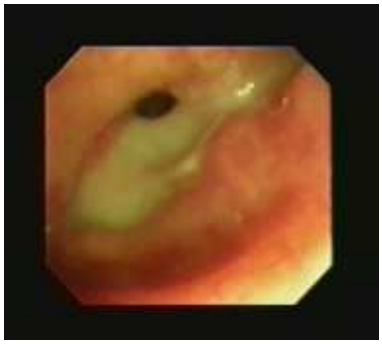
A. Placing one hand under the chin while the other pushes downward on the top of the head while preparing to perform rigid laryngoscopic intubation.
B. Rapidly withdrawing the flexible bronchoscope without visualization and without careful attention to the subglottic larynx.
C. Repeatedly administering additional amounts of topical anesthetic to a coughing patient
D. Routinely performing the bronchoscopic airway inspection in the same sequence in all patients.

III.22:以下除了哪一项以外的习惯会导致支气管镜操作者漏诊或者不小心损伤到患者？
A 在准备插入硬支气管镜时，一只手托住患者下巴，另一只手按住额头。
B 在没有连接可视化屏幕的纤维支气管镜没有仔细检查喉头的声门下部分就迅速把气管镜退出来。
C 给一个咳嗽的患者重复给予额外的局麻药
D 对于所有患者进行支气管镜气道检查时都按相同的顺序进行。

Question III.23: The airway secretions seen in the Figure below should be described as

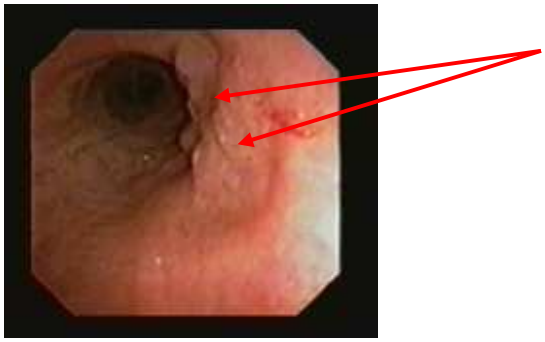
A. Clear
B. Viscous
C. Mucoid
D. Purulent

III.23:下图所见的气道分泌物的性状应该称为：
A 澄清
B 粘性
C 粘液性
D 浓性



Question III.24: The appearance of the bronchial mucosa along the lateral wall of the bronchus shown in the Figure below should be described as

A. Pale, raised, and granular
B. Thickened and erythematous
C. Erythematous, shiny and edematous
D. Thickened, red and swollen

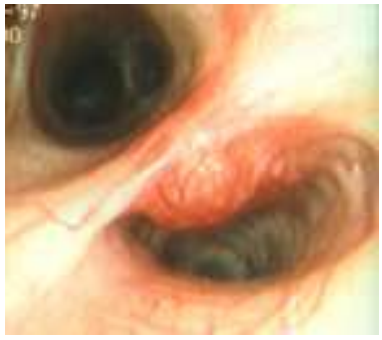


III.24:下图所示的支气管侧壁的粘膜外观应该怎么描述
A 苍白的粒状隆起
B 红斑状的增厚
C 有光泽的肿胀的红斑
D 红色的增厚的肿物

Question III.25: The appearance of the airway abnormality shown in the Figure below should be described as

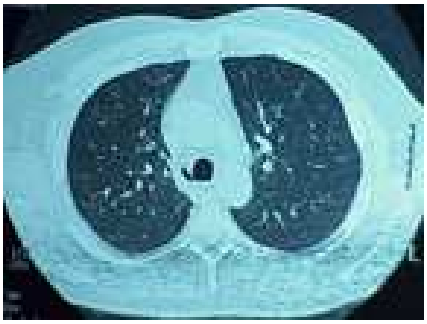
A. Polypoid
B. Nodular invasive
C. Superficial invasive
D. Intraepithelial neoplasia

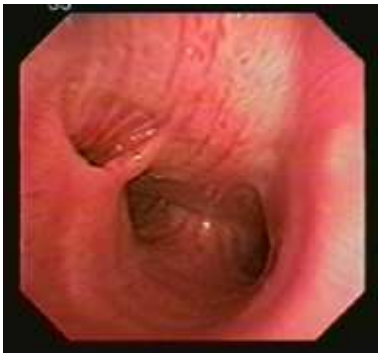
III.25:下图所示的气道病变的外观应该怎么描述
A 息肉
B 淋巴结浸润
C 表面浸润
D 内皮瘤



Question III.26: The bronchial anomaly seen in the figures below is.

A. A subapical segment of a right lower lobe bronchus
B. A tracheal bronchus, extending downwards and laterally from the right tracheal wall
C. An accessory right upper lobe bronchus





III.26:下图所示的支气管异常是
A 右下叶支气管根部
B 一个气管支气管，在气管右壁向横向下延伸
C 右上叶小支气管

Created on 5/5/2011 6:59:00 PM

Question III.27: All of the following airway dimensions in the adult are correct **except**.

A. The left lower lobe bronchus beyond the origin of the superior segment is usually 1 cm in length before giving rise to the basal segmental bronchi.
B. The usual length of the trachea (distance from the cricoid cartilage to the main carina) ranges from 9-15 cm.
C. The usual internal caliber of the trachea ranges from 1.2 cm -2.4 cm.
D. The right upper lobe bronchus is usually located about 1.5-2.0 cm below the main carina.
E. The usual length of the bronchus intermedius ranges from 2-4 cm beyond the origin of the right upper lobe bronchus.

III.27 以下哪一项关于成人气道的描述是错误的。
A 左下叶支气管在上升到基底段支气管时通常距离上段肺叶起始处约 1cm
B 气管一般的长度（环状软骨与隆突的距离）为 9~15cm
C 气管内径一般为 1.2 cm -2.4 cm
D 右上叶支气管开口通常位于隆突下 1.5-2.0 cm
E 支气管中段距离右上叶支气管起始处约 2-4 cm

Created on 5/5/2011 6:59:00 PM

Question III.28. All of the following may damage a flexible bronchoscope **except**:

A. Forceps biopsy in the apical segment of the right upper lobe.
B. Bronchoalveolar lavage in the lingula
C. Bronchoscopy through an endotracheal tube in a mechanically ventilated patient.
D. Transcarinal needle aspiration
E. Catheter brushing within the medial basal segment of the right lower lobe.

III.28. 以下哪一项有可能损坏纤支镜
A 用镊子在右上叶尖段取活检
B 在一个小肺段中行肺泡灌洗
C 通过气管导管给一个机械通气患者行支气管镜检查
D 穿过隆突进行针吸（活检）
E 用导管在右下叶中（前？）基底段进行刷检

Created on 5/5/2011 6:59:00 PM

Question III.29: All of the following statements pertaining to the safety of bronchoalveolar lavage are correct **except**

A. BAL can cause cough, bronchospasm, and dyspnea
B. BAL can cause a temporary decrease in Forced Expiratory Volume (FEV 1) of up to 20 %.
C. BAL can cause transient hypoxemia persisting for up to 6 hours.
D. BAL can cause radiographic lobar consolidation or peripheral opacities that might be suggestive of new onset procedure-related infection.
E. BAL can cause transient fever, chills, and myalgias.

III.29 下列哪一项关于支气管肺泡灌洗安全的说法是错误的
A BAL 会导致咳嗽、支气管痉挛、还有呼吸困难
B BAL 会引起 FEV1 暂时下降大约 20%
C BAL 会引起暂时的持续大约 6 小时的低血氧
D BAL 后出现影像学的肺叶实变影或者外周不透明等都提示新近发生的灌洗相关性感染。
E BAL 后会出现暂时的发热、寒战、肌痛。

Question III.30: Each of the following airway findings adversely effect staging and prognosis in a patient with bronchogenic carcinoma **except**

A. Discovery of occult vocal cord paralysis
B. Discovery of contralateral endobronchial nodule
C. Discovery of main carinal involvement
D. Discovery of infiltrating mucosal involvement within 2 centimeters of the main carina
E. Discovery of a lesion obstructing the central airways

III.30:下面除了哪一项外（支气管镜下所见）气道表现，均为支气管肺癌分期有不利影响（使患者被划分为更严重的期）有预后不良的表现。
A 发现隐匿的声带麻痹
B 发现对侧支气管淋巴结
C 发现有隆突转移
D 发现隆突 2cm 内的粘膜受累
E 发现中央气道阻塞性损害

Created on 5/5/2011 6:59:00 PM

模块 Ⅲ

阶段测试答案

Answer III.1: D

Midazolam (Versed) is currently the most widely used agent for conscious sedation. It is a water -soluble benzodiazepine with rapid onset of action. It is four times more potent on a mg per mg basis than diazepam for sedation and amnesia. When 5 mg are administered intravenously, sedation and anxiolysis usually occurs within 2 minutes. Complete recovery of motor performance and consciousness occurs within one hour in most individuals.

Sedative responses are increased in patients who have received opioides or other benzodiazepines. In addition, level of sedation and risk for respiratory depression are increased in the elderly and in patients with pre-existing respiratory dysfunction.

Combining Midazolam and opioides increases the incidence of apnea. Large doses can produce prolonged drowsiness and cardio respiratory arrest.

Midazolam does not cause seizures. Central nervous system dysfunction, including confusion and seizures can be seen in patients with brain metastases and in patients with paraneoplastic syndromes.

Seizures can also occur from Lidocaine toxicity (especially if hepatic dysfunction results in increased plasma levels) and Benzocaine-induced methemoglobinemia.

答案 **III.1 D**

咪唑安定是目前对意识清醒的患者进行镇静的最常用药物。它是一种短效的水溶性苯二氮卓类药物。其每毫克的镇静作用及致记忆缺失的作用是等剂量地西泮作用的 4 倍。静脉注射 5mg 的咪唑安定，其镇静及抗焦虑作用通常在 2 分钟内出现。对于大多数人，自主意识和觉醒状态大概在 1 小时之内完全恢复。

同时使用阿片类药物或者其他的苯二氮卓类药物的患者，咪唑安定对镇静作用的维持时间会延长。另外，镇静的深度及呼吸抑制的风险在老年人和呼吸功能障碍患者中将会增加。

联合使用咪唑安定和阿片类药物将增加患者呼吸困难的发生率。大剂量使用（咪唑安定）会使昏睡时间延长和心跳呼吸骤停。

咪唑安定本身不会诱发癫痫发作，但在脑转移性肿瘤或者副癌综合征患者中通常会诱发中枢神经系统功能障碍：包括意识丧失和癫痫发作等。

利多卡因中毒（特别是由于肝功能障碍导致其在血浆中的浓度增加）可以诱发癫痫发作，而苯唑卡因引起的高铁血红蛋白血症也可以诱发癫痫发作。

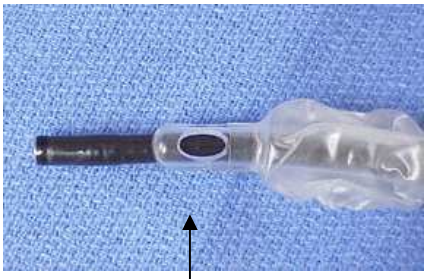
Created on 5/5/2011 6:55:00 PM

Answer III.2: D

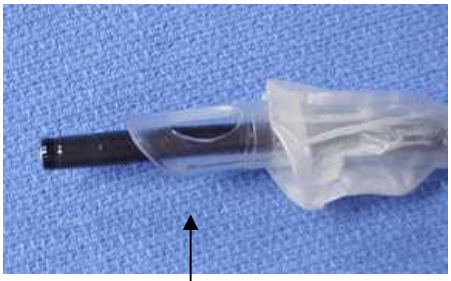
Although one might withdraw the scope and endotracheal tube once and try again as described in response D, such repeated attempts at intubation are often unsuccessful and traumatic. Precious time is wasted and the risks for hypoxemia are increased. Repeated trauma to the larynx can also prompt reflex laryngospasm, reflex arrhythmias and vomiting. Inadvertent esophageal intubation is a possibility, and tracheal esophageal fistulas have been known to occur.

If resistance is met during intubation, remember that the epiglottis or the arytenoids are a frequent encountered obstruction after passing an endotracheal tube over a bronchoscope through the nares or through the mouth. Endotracheal tubes can also inadvertently enter aryepiglottic folds. Sometimes it helps to grasp the patient's tongue with a gauze pad, and to ask an assistant to pull the tongue out of the mouth slightly. This creates more space to maneuver in the oropharynx.

If intubation is still unsuccessful, it is best to change techniques in order to facilitate passage of the endotracheal tube between the vocal cords. All the techniques described in responses A, B, and C should be considered. A larger diameter bronchoscope allows for better manipulation and control of the endotracheal tube than a small diameter bronchoscope. By filling up more of the space within the endotracheal tube, the larger-sized scope and endotracheal tube ensemble is more readily maneuverable. Although it is recommended to intubate with the largest size endotracheal tube possible, most experts agree that a 7,5 endotracheal tube is the largest diameter tube that should be inserted through the nares. Rotating the scope 90 degrees clockwise or counterclockwise will change the angles of the curved tip of the endotracheal tube and might facilitate laryngeal intubation.



No space with smaller caliber tube



Space between scope and 8.0 endotracheal tube

Created on 5/5/2011 6:55:00 PM

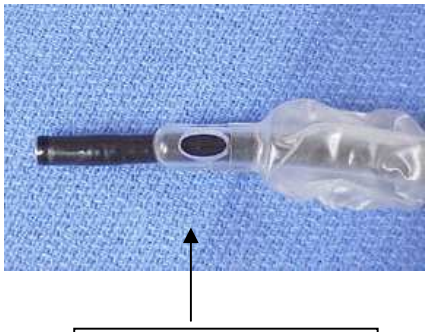
III.2: D

虽然操作者可以像 D 选项描述的那样把支气管镜和气管导管退出，然后重试一遍，但类似这样气管置管的操作经常都不会成功，而且会导致损伤。先前插管本身耽误了很多时间，导致患者缺氧的风险增加。对喉头重复的损伤会引起放射性喉头痉挛、反射性心律失常和呕吐。有可能不小心插到食道，或者有时候会引起气管食道瘘。

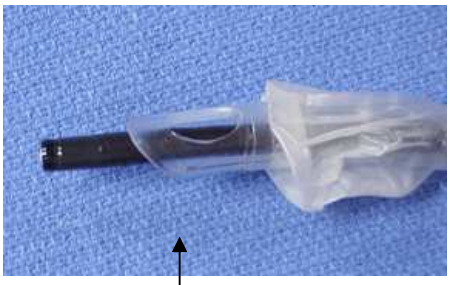
如果插管的时候阻力很大，记住在支气管镜引导气管导管经鼻或者口经过会厌或者 杓状软骨时会遇到阻力，气管导管不小心进入杓会厌皱襞。有时候用纱布拉住患者的舌头或者叫助手把患者的舌头轻轻拉出口腔对解决这个问题有点帮助，因为这样使口咽部有更多的空间进行操作。

如果插管仍然不成功，那最好改变操作使气管导管更容易通过声带。A.B.C.几项的做法都可以考虑。直径大一点的支气管镜相对小直径的更容易操作，而且更好控制气管插管。

通过占据气管导管内更多的空间，一个粗一点的支气管镜和气管导管套在一起，将更容易操作。 虽然推荐尽可能用直径大一点的气管导管，大多数专家都同意 7、5 号气管导管是可以通过鼻腔置入的最粗的导管。顺时针或者逆时针可以改变气管导管尖端弯曲的角度，这样可以更容易通过喉部。



纤支镜在小口径的气管导管中没有多余的空间



直径为 8.0 的气管导管和纤支镜之间有一定的空间

Created on 5/5/2011 6:55:00 PM

Answer III.3: C

Fentanyl is a synthetic opiate analog that is structurally different from morphine or meperidine. The usual adult dose is 50-100 micrograms. Given intravenously, its onset of action and maximum respiratory depression effect occurs about 5-10 minutes after administration, and lasts anywhere from 30-60 minutes. Given intramuscularly, the onset of action is within 7-15 minutes with duration of action lasting up to two hours. Fentanyl should never be used in patients receiving MAO inhibitors because of increased risk of respiratory depression and coma.

III.3: C

芬太尼是合成的鸦片类似物，结构和吗啡、哌替啶等不一样。一般剂量为 50-100 微克。如果静脉注射，它的药效和最大呼吸抑制作用在注射后 5-10 分钟出现，并药效持续约 30-60 分钟。如果肌肉注射，在注射后 7-15 分钟起效，药效维持约两小时。芬太尼禁用于使用单胺氧化酶受体抑制剂的患者，因为这样会增加呼吸抑制和昏迷的风险。

Created on 5/5/2011 6:55:00 PM

Answer III.4: E

Naloxone is a pure opiate antagonist that reverses all effects and side effects of opiates. Actually, no more than 10 mg should be administered because this might lead to increased activity of the sympathetic nervous system from acute termination of analgesia. Consequently, patients may develop hypertension, dysrhythmias, and pulmonary edema.

In case of over sedation with benzodiazepines, the benzodiazepine antagonist Flumazenil should be administered (0.2 mg iv over 15 seconds then repeated every minute up to a maximum of 1 mg). Low doses of Flumazenil will reliably reverse sedation within 2 minutes, but higher doses are needed to reverse benzodiazepine-related anxiolysis. Side effects include nausea, vomiting, tremors, seizures, tears and dizziness. Contrary to naloxone, it does not cause hemodynamic instability.

III.4: E

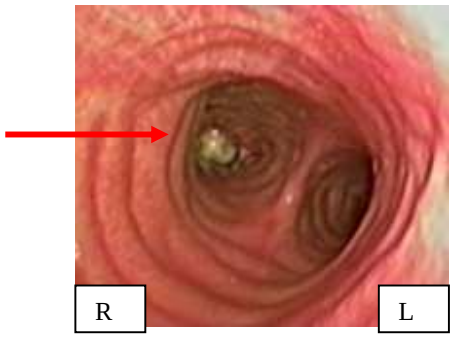
纳洛酮是一种纯阿片受体拮抗剂对抗阿片类药物的所有作用与副作用的。实际上，注射不应该超过 10mg 因为这样会激动交感神经系统，使到痛觉缺失终止。随后，患者有可能出现高血压、心律失常、和肺水肿。

为了减少苯二氮平类药物镇静作用的时间，其拮抗剂氟马西尼（0.2mg）静脉注射 15 秒后每分钟重复给药一次，直到最大剂量 1mg，低剂量的氟马西尼肯定可以在 2 分钟之内拮抗镇静效应。但是拮抗苯唑地西泮相关性抗焦虑作用需要高剂量。（氟马西尼）副作用包括恶心、呕吐、癫痫发作、震颤、流泪、眩晕。和纳洛酮相比，它不会引起血流动力学的改变。

Created on 5/5/2011 6:55:00 PM

Answer III.5 A

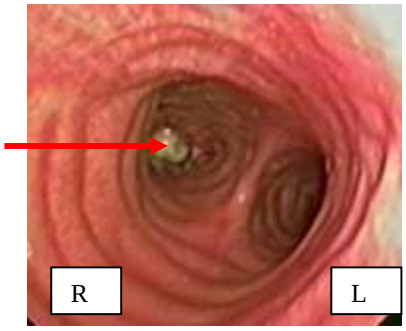
The lesion is noted in the right main bronchus. The anterior cartilaginous rings and posterior membrane of the trachea are well visualized. It is prudent to proceed with an examination of the left bronchial tree before intervening in any way on the right side. This way, the presumed normal airway is examined and secretions are cleared. Should bleeding occur after biopsy of the lesion on the right, the bronchoscopist will know that the left airway is normal, able to assure respiration, and that there are no contra lateral abnormalities that might effect patient management.



Created on 5/5/2011 6:55:00 PM

III.5 A

损伤发生在右主支气管。前面的软骨环合和后面的气管粘膜都清晰可见。在处理右侧之前，必须先非常小心地进行左支气管树的检查。这样，假定正常的气管先检查，清干净分泌物，如果在右侧行活检时出现，操作者就知道左侧是正常的，而且可以确保通气，而且没有不正常的情况影响患侧的处理。



Answer III.6: B

Each of the above problems can be encountered during intubation over a flexible bronchoscope. It is probably wisest to remove the bronchoscope and endotracheal tube together as a unit. If one withdraws one without the other, one risks damaging the bronchoscope. In addition, the problem may not be fixed.

Before intubating over a bronchoscope, one should fully load the endotracheal tube onto the bronchoscope under direct vision, taking care to identify the radio-opaque markers on the tube, as well as the Murphy eye and direction of the distal opening of the endotracheal tube. Some experts believe that the endotracheal tube should remain fully loaded onto the bronchoscope until the scope is passed beyond the vocal cords. The endotracheal tube is then fed into the trachea using the Seldinger technique.

Other experts recognize that on some occasions, such as when there is subglottic stenosis, laryngeal edema, tumor, blood or secretions, it might be preferable to keep the tip of the bronchoscope inside the endotracheal tube. The bronchoscope-endotracheal tube ensemble is then passed simultaneously past the cords. In case of severe tracheal stenosis, this technique avoids blind forceful dilation of the stricture as the bronchoscopist can see and feel the tube enter the stenotic area.

Each of the above techniques should be practiced on inanimate models. The bronchoscopist should use the technique with which he or she is most experienced, and always choose the safest technique based on the patient's underlying illness and ventilatory status.

III.6 B

以上的问题在可弯曲的支气管镜中都可能会碰到，最明智的做法是把支气管镜和气管导管一起取出。如果只取一个，而另一个不取出，那么其中一个风险就是损坏支气管镜。而且问题可能仍然得不到解决。

在支气管镜引导下插管前，应该在直视下把气管导管完全套在支气管镜上，注意确认导管上包括侧孔、气管导管远端开口处也有不透 X 线的标志物在。部分专家认为在气管镜没有通过声门之前，气管导管必须完全套在气管镜上。然后用 Seldinger 手法把气管导管送入气管。

另一部分专家认为在一些情况，比如当声门下狭窄，喉头水肿，肿瘤、血或者分泌物的时候，最好（在把气管导管送入气管过程中）保持支气管镜尖端在气管导管内。气管镜和气管导管一起通过声门，在声门狭窄时，这样做可以避免盲插时对气管结构的强烈扩张，因为操作者可以看到而且感觉到狭窄的区域。

以上的技术应当在人造模型上练习好。操作者应该用自己最熟悉的技术，而且要根据患者的基础疾病和通气状况选择最安全的操作手法。

Answer III.7 : E

Exposure to Glutaraldehyde may cause nasal irritation and all the other symptoms listed above except diarrhea. It is important that cleaning areas be well ventilated. Automated cleaning and disinfecting machines relieve personnel from the time-consuming manual disinfection process. They do not replace manual cleaning that is necessary before and often after machine disinfection. Specific infectious outbreaks have been reported with a variety of organisms, and cross infection has occurred between bronchoscopes and among patients.

For example, organisms have been found in the rinse water of automated machines. Fundamental errors in disinfection and cleaning regularly occur in many institutions. There is substantial intrahospital and interhospital variability regarding policies and procedures for bronchoscope decontamination, cleaning, disinfection, and maintenance.

Close collaboration between infectious disease specialists (hospital epidemiologists), bronchoscopists, nursing personel is advantageous. Learning sterilization and cleaning procedures and policies can help future bronchoscopists institute appropriate rules and regulations in their own hospitals later on.

III.7 E

接触戊二醛可以导致鼻部刺激症状，还有以上列出的除了腹泻以外的其他症状。清洗区保持良好通风是很重要的。自动清洗、消毒设备可以使免除烦琐的人工消毒过程。但是机器消毒不能代替人工消毒，所以经常机器消毒前或者消毒后进行需要进行人工消毒。已经有报道多种特殊病原体感染，病人和支气管镜操作者的交叉感染也时有发生。

比如，在自动冲洗机的冲洗水中发现病原体。很多机构的消毒和清洗规程是有原则性错误的。医院内和医院之间的关于支气管镜去污、清洗、消毒、维护的规则和过程是不一样的。

感染科专家（医院流行病学家）和支气管镜、护士的等专业人员的紧密合作是很重要的。学习灭菌和清洗的过程和方法可以帮助以后支气管镜操作者在他们的医院制定合适的（支气管镜清洗）指南。

Answer III.8: C

Video bronchoscopes are as likely to be damaged by Glutaraldehyde as fiberoptic scopes. The CCD (charge coupled device) is a solid-state imaging sensor that is able to produce higher resolution images than a purely fiberoptic system. Fiberoptic bundles are still used in the light guide and universal cord. High-level disinfection requires a 45 minutes immersion to inactivate all fungi, viruses, and vegetative organisms, as well as about 95% of bacterial spores. To eradicate all mycobacteria, a 45 minutes immersion is necessary.

In fact, the 10 minutes immersion time used in many institutions to accelerate bronchoscope turn around time eradicates 99.8 % of Mycobacteria. Glutaraldehyde-based chemicals such as Cidex or Sporicidin corrode the steel components of any bronchoscope after 24 hours of contact time. These chemical solutions can be toxic to exposed persons.

III.8: C

电子支气管镜和纤维支气管镜一样，很容易被戊二醛损坏。CCD（控制连接装置）是一种固体的影像感受器，可以生成比只有纤维支气管镜的系统更高分辨率的图像。纤维束仍然用于灯光引导和普通带。高规格的消毒需要 45 分钟浸泡去灭活真菌、病毒和有活力的病原微生物，还有大约 95%的细菌芽孢。要灭活所有的分枝杆菌，浸泡 45 分钟是必须的。

实际上，在很多机构里为了加快支气管镜的消毒时间，一般只浸泡 10 分钟左右，可以灭活 99.8%的分枝杆菌。以戊二醛为基本基团的化学品，比如 Cidex 或者

胶醛消毒剂会在接触 24 小时后腐蚀支气管镜。这些化学溶剂会对接触它的人中毒。

Answer III.9: B

Primary x-rays are those photons emitted by the x-ray tube, whereas scattered x-rays are those photons produced when primary photons collide with electrons in matter. Did you think this information is irrelevant? In the United States, many states or institutions require certification (by studying for and passing a special examination) in order to personally control a fluoroscopy machine!

III.9: B

原发辐射是 X 线管发出的光子，而散射是原发辐射的光子碰撞到物体的电子产生的。你觉得这些信息是无关紧要的吗？在美国，很多州和机构从事 X 光机器操作人员是需要认证的，这需要学习和通过特殊的检查。

Created on 5/5/2011 6:55:00 PM

Answer III.10: D

Scatter, also known as Compton scatter, is non-useful ionization of patient tissue caused by x-ray bombardment. Scatter occurs when an x-ray photon with increased energy strikes an electron and is deviated from its original path. This is potentially caused by increased voltage or decreased wavelength, and also when tissues thickness is increased and tissue density is increased. The x-ray photon thus travels in a different direction, but with less energy.

An increase in scatter diminishes the quality of the fluoroscopic image, and decreases the contrast of the image seen on the monitor by increasing what is referred to as quantum mottle. Quantum mottle looks like “crawling ants” on the screen. It results from an insufficient number of photons and can be reduced by increasing the milliamperage i.e. anode tube current.

III.10 D

散射，也叫做康普顿散射，是在原发 X 光束碰撞患者组织后产生的无用电离辐射。散射发生在 X 线的高能光子碰撞电子后偏离里原先的方向产生的。这个可以由产生 X 线的电压升高或者波长减少，还有组织厚度增加，组织密度增加等等。X 线的光子可以射向不同的方向，但是能量将会减少。

散射增加会使到 X 光形成的影响质量下降，而且会通过平时说的量子斑减少图像的在显示屏的对比度。量子斑看起来像在屏幕“爬行的蚂蚁”。可以通过增加阳极电流的来减少。

Created on 5/5/2011 6:55:00 PM

Answer III.11: B

Bronchoscopy is frequently indicated and performed in critically ill patients. For example, accepted indications include copious secretions that cannot be cleared by routine suctioning, persistent or acute unexplained hypoxemia, unexplained failure to wean from mechanical ventilation, new onset of hemoptysis, pulmonary infiltrates with suspicion for infection when the bronchoscopic procedure is likely to alter therapy, and persistent or hemodynamically significant radiographic atelectasis that is unresponsive to chest physical therapy or suctioning.

If it appears that numerous procedures are being performed without good evidence of radiographic abnormalities, impaired oxygenation or ventilation status, or difficulties with secretion management, indications for bronchoscopy should probably be closely examined to be certain that procedures are being performed in the appropriate circumstances.

Of course, the decision to perform bronchoscopy can often be based on a subjective assessment of the situation rather than on hard objective data. This can easily lead to bronchoscopy in the intensive care unit being easily be performed in excess. Practices can also vary according to available resources, staffing, and referring physician preferences.

III.11: B

支气管镜是经常用于重症患者。比如，一般的适应症包括了分泌物过多，不能用常规吸痰清除、持续性或者急性的缺氧，无法解释的脱机后出现的呼吸衰竭、新近出现的咯血、可疑为感染引起的肺渗出病变，纤支镜检查有可能改变治疗策略的时候，还有持续的、对胸部物理治疗和抽吸都没反应的、伴随严重血流动力学改变的有影像学表现的肺不张。

如果是在没有很好的影像学异常证据，氧合和通气的损伤状态，或者分泌物处理困难的时候行纤支镜检查，那么必须认真考虑支气管镜的适应症，确保检查是在稳妥的状态下进行的。

当然，做纤支镜的决定经常是基于对患者病情的主观估计而不是客观的硬指标。这样会使到 ICU 里过度使用支气管镜。使用率会随着可使用的资源，人员、还有相关医师的个人偏好而变化的。

Created on 5/5/2011 6:55:00 PM

Answer III.12: C

Oral intubating airways help the bronchoscopist keep the flexible bronchoscope in the midline, expose laryngeal structures, and maintain an open pharynx. The Ovassapian fiberoptic intubating airway provides an open space in the oropharynx and protects the bronchoscope from being bitten by the patient. The airway can be removed without disconnecting the endotracheal tube adaptor. The wider distal half of the airway prevents the tongue and soft tissues of the anterior pharyngeal wall from falling back and obstructing the view of the glottis. The proximal half has a pair of guide walls that provide a space for the bronchoscope and endotracheal tube. This airway accommodates endotracheal tubes up to 9 mm inner diameter.

The Berman airway is also recommended for bronchoscopic intubation, but its length and tubular shape hinder maneuverability of the flexible bronchoscope once it is inserted. If the distal end of this airway is not perfectly in line with the glottic aperture, the airway must be partially withdrawn in order to expose the vocal cords.

The Williams airway intubator was designed for blind orotracheal intubation. Its distal half has an open lingual surface, which makes lateral and anteroposterior maneuverability of the bronchoscope difficult. In order to remove the Williams airway after intubation, the endotracheal tube adaptor must be removed prior to intubation.

III.12: C

经口插管经常都可以帮助支气管镜操作者保持支气管镜在中线，暴露咽喉结构，保持咽喉开放。Ovassapian 纤支镜气道提供了一个口咽部开放的空间，防止支气管镜被患者咬烂。开口器可以在不断开气管插管连接头的情况下移除。更宽的远端的一半气道防止舌头和烟前壁的软组织后坠并且阻挡声门的视野。近端的一半有一对指示壁（扁桃体？）提供给支气管镜和气管插管空间。这种气道可以容纳内径是 9mm 的气管插管。

Berman 气道也是气管插管推荐的的，但是一旦插入这种气道，它的长度和管型会阻碍支气管镜的操作。如果远端气道和声门不是在一条直线上，那么这种气道需要部分退出，以保证暴露声门。

Berman 气道是为盲插时设计的。它的远端部分有舌板，会使到支气管镜侧面和前后的操作变得很困难。为了插管后拔出 Williams 气道，气管插管必须的接口拔出

Created on 5/5/2011 6:55:00 PM

Answer III.13: E

Well, you probably had to think about this one. In fact, when considering a tracheal lesion for surgical repair, all of the above should be well described. The reason the noted response is E, is because the distance from the inferior margin of the vocal cords, may, in many instances, be the deciding factor regarding evaluation of complexity of surgical resection.

Of course, other components of tracheal disease that should be described are length of the stricture in centimeters and number of cartilage rings involved, consistency (firm, rubbery, soft), appearance (glistening, vascular), fragility (oozing, actively bleeding, pus-filled), color (white, red, dark, yellow), shape (regular, round, irregular, elongated, bulging), dynamics (mobile with respiration or cough, ball-valving, immobile), degree of airway wall involvement, associated airway wall abnormalities (malacia, cartilaginous destruction, foreign body). Having a videotape of the examination available for review by surgical colleagues is always appreciated.

III.13: E

你很有可能要考虑到这些问题，实际上，当气管损害需要外科手术修复的时候，以上所有的因素都要好好的描述。而最需要重点描述 E 的原因是，在很多情况下，（病变部位）与声门下缘的距离是评估外科手术复杂程度的最重要的因素。

当然，其他需要描述的气管疾病的因素是描述狭窄部位的长度（具体多少厘米），一共涉及多少个软骨环，硬度（硬、有弹性、软），外观（光洁、血管丰富），(脆性）是否容易破溃（渗液、活动性出血、积脓），颜色（白色、红色、黑色、黄色），形状（规则、圆形、不规则、细长、膨隆）、动度（随呼吸或者咳嗽移动，带活瓣的球形、不移动）对气道壁的侵袭程度、相连气道壁的异常（软化、软骨破坏、异物）。给你的外科同事放一段该患者做支气管镜检查的录影做手术评估，通常都会得到对方的赞赏

Created on 5/5/2011 6:55:00 PM

Answer III.14: A

Methemoglobinemia can result from exposure to Benzocaine, the Esther family local anesthetic contained in Cetacaine and Hurricane, two aerosol sprays frequently used for topical anesthesia of the oropharynx. Risk is greatest in the elderly and in infants. Diagnosis should be suspected in patients who develop cyanosis with bluish discoloration of the skin, lips and mucous membranes. It is confirmed by Co-oximetry. Up to a methemoglobin level of 20 percent, oxygen saturation drops by about half the methemoglobin percentage. Patients develop a functional anemia because the ferrous hemes of hemoglobin are unable to bind oxygen. Treatment is by intravenous injection of 1-2 mg/kg Methylene blue.

Acute onset laryngospasm would cause stridor and respiratory distress. Tetracaine, a long-acting and potent topical anesthetic, is also a component of Cetacaine aerosol spray (2% Tetracaine, 14% Benzocaine, 2% butyl ester of *para*aminobenzoic acid). Tetracaine is a derivative of *para*aminobenzoic acid, and can thus cause allergic reactions. Its rapid rate of absorption and prolonged duration of action compared to Lidocaine are in part responsible for its narrow margin of safety when used for bronchoscopy. Systemic effects include convulsions and sudden death. Other symptoms include restlessness, numbness around the lips and mouth, tonic-clonic seizures, hypotension, and apnea. Lidocaine is an amide local anesthetic that is less potent and has a shorter duration of action than Tetracaine. It comes in various solutions ranging from 0.5% to 4%. The 4% solution provides about 15 minutes of reliable topical anesthesia. A 10% solution is available for spraying the oral and nasopharynx. Each spray delivers 0.1 ml (10 mg) of Lidocaine. A 2.5% and 5% gel is also available, and usually preferred by patients for anesthesia of the nasal passages. Peak concentration is usually reached within 30 minutes of airway application.

The maximum dose of Lidocaine recommended is 300 mg in adults. Blood concentration is directly related to total dose used regardless of the concentration of solution employed. When Lidocaine is administered by aerosol spray, it is absorbed less rapidly than if it is administered by ultrasonic nebulizer. In addition, when swallowed, less Lidocaine is absorbed into the bloodstream than when it is deposited onto the mucous membranes of the upper and lower respiratory tract.

Because Lidocaine is metabolized in the liver, patients with hepatic dysfunction or low cardiac output will have high Lidocaine plasma levels. Side effects include hyperactivity, restlessness, tingling of the lips, slurred speech and tremors. At higher blood levels, seizures and cardiorespiratory depression occur, including bradycardia, hypotension, and cardiac arrest.

III.14: A

苯坐卡因可以引起高铁血红蛋白症， Esther family 局麻药带有西他卡因和抛射剂，这两种喷雾经常用于口咽部的局麻。这对于老年人和小儿来说是很危险的，如果患者出现进行性的皮肤、嘴唇、粘膜的紫绀，这个可以用氧饱和度计来证实，当高铁血红蛋白水平达到 20%，氧饱和度只有一半左右。患者会出现功能性贫血，这是因为血红蛋白的含铁血红素不能结合氧了。治疗方法是按 1-2 mg/kg 静脉注射亚甲基蓝（美蓝）

急性的喉痉挛会引起喘鸣和呼吸窘迫。丁卡因是一种长效而且有效地局麻药，也是西他卡因气雾剂(2% 丁卡因, 14%苯坐卡因, 2% 对氨苯甲酸丁酯)的组成成分，丁卡因是从对氨苯甲酸中提取的，会引起过敏反应。它比利多卡因的吸收率高，作用时间长，这个部分弥补了它的在应用于支

气管镜检查时安全范围比较窄的缺点。全身的不良反应包括了抽搐和猝死。其他症状包括烦躁不安，口和嘴唇麻木，强直-痉挛性癫痫，低血压和呼吸暂停。利多卡因是一种氨基化合物类的局麻药，作用没有丁卡因那么强，而且作用时间比较短。它在不同的配剂中的浓度有 0.5%到 4%。4%的利多卡因可以局部麻醉大约 15 分钟。10%的制剂可以用于局部喷咽喉，从而达到麻醉效果。每一喷带有 0.1ml (10 mg)的利多卡因。也有 2.5% 和 5%的凝胶，在鼻部的麻醉中比较受患者欢迎。高浓度的制剂用于气道麻醉时作用时间可达到 30 分钟。

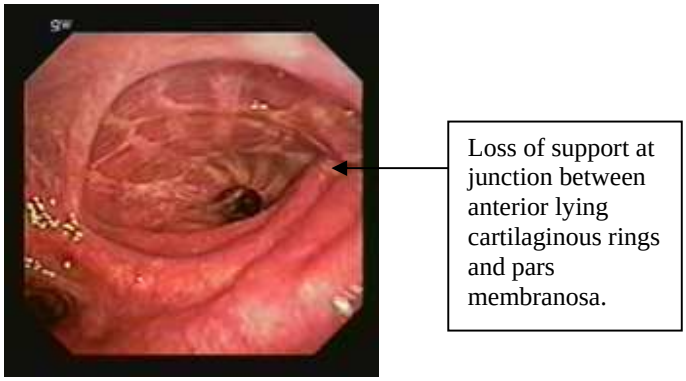
利多卡因推荐的成人最大剂量是 300mg。血药浓度与总剂量有关，和制剂的浓度无关。当利多卡因用于雾化时，用超声雾化器可以延缓它的吸收。在口服的时候，由于沉积在上呼吸道和下呼吸道的粘膜中，吸收入血的比较少。

由于利多卡因在肝代谢，有肝功能不全或者心输出量低的患者会有较高的血浆浓度。副作用包括多动、烦躁不安、口唇麻木、语音模糊和震颤等。在更高的血药浓度时，会出现癫痫、心肺抑制，包括心动过缓、低血压、还有心跳骤停。

Answer III.15: A

Inspiratory collapse should be noted in a malacic cervical trachea when the malacic tracheal wall is sucked inwards by negative intratracheal pressure. During expiration, collapse of the intrathoracic malacic segment occurs when intrathoracic pressure exceeds intratracheal pressure. Tracheomalacia can be noted during bronchoscopic examination and electron beam computed tomography scanning. It should be suspected in patients after longstanding intubation, in patients with history of pneumonectomy and herniation of the remaining lung into the vacant hemithorax, and in patients with dyspnea, difficulty raising secretions, and chronic cough.

Usually, malacia is diagnosed when cartilaginous collapse is noted during airway inspection. Some experts believe that it should be differentiated from dynamic airway collapse where significant obstruction is due to inward movement of the pars membranosa, but without evidence of cartilaginous destruction or loss of rigidity and shape of cartilaginous rings. To avoid confusion or misunderstandings, one should be explicit in describing the extent, severity, location, and nature of all anomalies noted.



Created on 5/5/2011 6:55:00 PM

III.15: A

由于，软化的气道壁被胸内负压的吸引，从而使到胸外的软化气道会在吸气相塌陷。在呼气相，胸内的软化部分由于胸腔压大于气道压而塌陷。气道软化可以在支气管镜检查和 CT 检查中发现。在长期插管的患者，有肺切除病史而且剩余肺组织进入切除后患侧（空的）半胸腔形成疝的患者，呼吸困难、清除气道分泌物困难、而且有慢性咳嗽的患者中要高度怀疑这种病。

通常，在吸气相发现软骨塌陷可以诊断气道软化症。一些专家认为这个病要和严重的阻塞导致的正常粘膜向内运动产生的动态气道塌陷（但是没有软骨破坏和缺乏硬而且成型的软骨环的证据）相鉴别。为了避免混淆和理解错误，你应该把范围、严重程度、位置等所有的异常情况进行详细地描述。

Answer III.16: E

Actually, maximum upper airway edema peaks as late as 36-48 hours after injury! If a patient is intubated, extubation is frequently delayed until all edema has resolved. The absence of edema, stricture, or subglottic swelling during bronchoscopically-guided extubation, or a leak around the endotracheal tube are two indicators that are used to help determine the time for extubation.

When patients present with inhalation injury, chest radiographs and arterial blood gases are notoriously unhelpful in predicting whether parenchymal injury has occurred. In addition, findings may be delayed hours and even days. For these reasons, in many burn centers, all smoke exposed victims are bronchoscoped routinely. Presence of dyspnea, wheezing, laryngeal abnormalities, tracheobronchitis, and abnormal arterial blood gases or chest radiographs almost always warrants intubation. Delayed problems include tracheobronchial tissue sloughing, decreased mucociliary clearance, mucous plugging, atelectasis, impaired clearance of secretions, pneumonia, pulmonary edema and acute respiratory distress syndrome.

III.16: E

实际上，最严重的上气道水肿发生在损伤后 36-48 小时。如果给患者插管，拔管通常要到水肿完全消退才能进行。在支气管镜引导下拔管时，（气道）没有水肿、狭窄、声门下肿胀和气管导管周围有空隙等现象都提示（气道情况）已合适拔管。

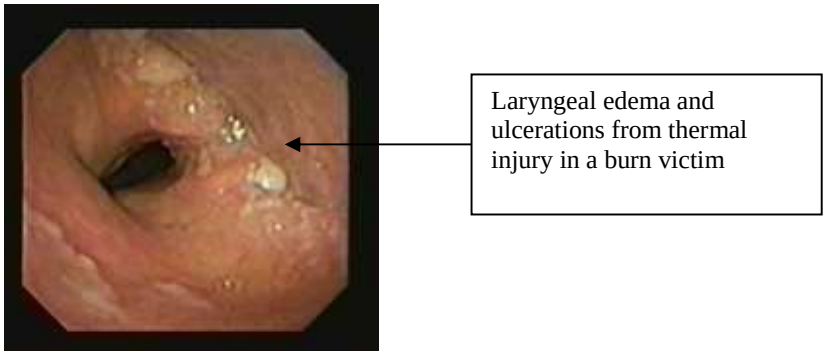
当患者有吸入性损伤，胸片和动脉血气都不能准确地反映肺实质是否有损伤。而且（这些检查）有可能在损伤发生几小时甚至几天后才有阳性表现。由于上述原因，许多烧伤中心都把支气管镜检查作为接触烟雾患者的常规检查。呼吸困难、喘鸣、喉咙异常、气管-支气管炎、动脉血气异常、胸部影像学资料都不可以为插管提供依据。延误插管的后果包括气管-支气管组织的脱落，纤毛的清洁气道能力下降，粘液堵塞、肺不张、清除分泌物的能力下降、肺炎、肺水肿、ARDS 等。

Created on 5/5/2011 6:55:00 PM

Answer III.17: D

Erythema, hemorrhage and ulcerations are frequently noted as a direct effect of thermal injury to the upper or lower airways. This occurs most frequently from hot smoke or steam inhalation, but can also result from direct heat injury during therapeutic bronchoscopic electrocautery and laser resection. Although the upper airway protects the lower airway and parenchyma, any exposures to hot air may cause reflex laryngospasm. Laryngeal complications can occur acutely, but also many hours after injury. They are frequently life threatening. Edema and inflammation are proof of upper airway injury and are often immediately visible to the bronchoscopist.

The presence of carbonaceous secretions in the oropharynx also suggests airway damage. Lower airway injury, however, is typically delayed. Many experts say that “if in doubt” about upper or lower airway injury, immediate intubation should be preferred to a ‘watch and wait” approach. The presence and extent of lower airway injury can be ascertained on follow-up flexible bronchoscopy. Extubation should be done carefully because of the risk of persistent laryngeal and subglottic edema as well as laryngeal swelling due directly to the endotracheal tube or prolonged intubation.



III.17: D

红斑、出血、还有溃疡都是提示上气道或者下气道的直接的热损伤。热烟雾或者吸入水蒸气、还有电子支气管镜治疗和激光切除术的直接热损伤都可以导致以上损害的发生。虽然上气道可以保护下气道和肺实质，热气体的接触都可能导致反射性的喉痉挛。喉头的并发症可以马上发生也可能在损伤几小时候发生。这些损伤通常都是致命的。水肿和炎症时上气道损伤的证据，通常可以马上被支气管镜检查发现。

口咽部分泌物含碳量增加也是气道损伤的一个标志。下气道损伤通常都是迟发型的。许多专家认为如果对诊断有怀疑，那么马上插管是“边治疗边观察”的一个不错的选择。随后的纤支镜检查可以探查是否有下气道的症状和程度。由于持续的咽喉和声门下水肿会影响气管导管（的拔除）而且会导致插管时间延长，所以拔管时必须非常认真。

Created on 5/5/2011 6:55:00 PM

Answer III.18: D

The major question here is whether this patient should be referred for laser resection or immediate surgery. Adenoid cystic carcinoma (previously known as cylindroma) accounts for about 0.1% of all primary lung tumors and 10% of bronchial adenomas (which also include carcinoid tumors and mucoepidermoid tumors). If the patient is clinically and hemodynamically stable, has no contraindications for surgery, and is willing to undergoing tracheal resection, referral for sleeve resection with removal of at least 6 tracheal rings (there are about two tracheal cartilages per centimeter) and reanastomosis is warranted.

Often, surgical margins reveal microscopic tumor. Many patients are subsequently referred for external beam radiation therapy. Despite resection, recurrence occurs in more than 50% of patients, and metastases are known to occur to the lung, brain, liver, bones and skin. Tumors usually grow very slowly. Even in case of tumor recurrence, survival can be 10 –15 years.

III.18: D

这里主要的问题是患者应该接受激光切除手术还是马上外科手术治疗。囊腺瘤（以前叫圆柱瘤）约占原发性支气管癌的 0.1%,占支气管腺瘤的 10%（包括了良性肿瘤和粘液上皮瘤）。如果患者病情和血流动力学稳定，无手术禁忌症，而且愿意行（部分）气管切除术。那么，行“袖套样”切除术会切除约 6 个气管软骨环（每厘米的气管大约有 2 个气管软骨环），而且行气管吻合术。

通常，微肿瘤是外科手术的盲区。许多患者随后接受放疗。即使切除了（肉眼见到）肿瘤，复发率仍然有 50%，癌细胞可以向肺、脑、肝、骨和皮肤转移。肿瘤通常生长很慢，即使肿瘤复发，仍然有 10-15 年的生存期。

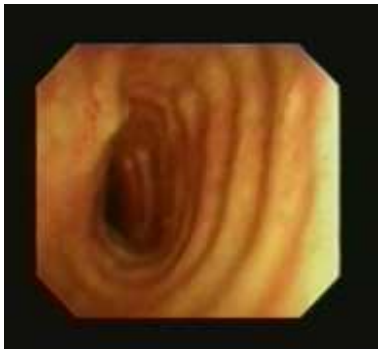
Created on 5/5/2011 6:55:00 PM

Answer III.19: D

The figure is that of a saber-sheath or scabbard trachea. Saber-sheath trachea is defined as a trachea with excessive transverse narrowing and widened sagittal diameter of the intrathoracic portion of the trachea. This is very different from the C-shaped trachea seen in about 49% of normal adults. The saber has been described in up to 5 % of elderly men. In these instances, ossification of tracheal rings may also be found. Usually, the abnormality spares the cervical portion.

The majority of patients with saber-shaped trachea have chronic obstructive pulmonary disease, and it is believed that the narrowing is related to air-trapping in emphysematous upper lobes, chronic cough, and cartilaginous degeneration. When discovered, additional study by computed tomography scanning may be warranted. The differential diagnosis includes extrinsic compression by extratracheal mediastinal mass, tracheobronchopathica osteochondroplastica, amyloidosis, relapsing polychondritis, and saber-sheath trachea in patients with excessive kyphosis.

Saber-sheath trachea



C-shaped trachea

Horseshoe-shaped trachea

Created on 5/5/2011 6:55:00 PM

III.19: D

下图是剑鞘样气道或者叫鞘样气道。剑鞘样气道的定义是气管受到过度的横向压迫而导致狭窄，气管的胸廓内部分的矢状面增宽。这与大约 49%正常人的 C-型的气管不一样。5%的老年人的气管被称为“军刀”型，在这些情况下，会发现气管软骨钙化。通常，颈部（胸廓外的）气道没有不正常的软骨。

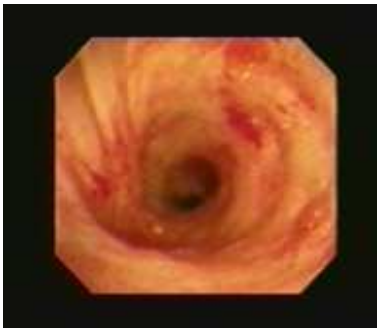
多数有“军刀”型气道的患者有 COPD 疾病，气道狭窄是因为上肺叶肺气肿、慢性咳嗽、和软骨变性等引起的气道塌陷导致的。当发现这些病变，最好再做 CT 检查。鉴别诊断包括了气道外纵膈肿物压迫、气管支气管软骨软化症（玻璃样变性）、淀粉样变性、复发性多发性软骨炎、还有过度脊柱后凸症有“军刀”型气道的患者。

Answer III.20. D

A frequent cause of hemoptysis during mechanical ventilation is suction trauma due to stiff suction catheters. The figures below shows petechia and erythematous swelling from aggressive suctioning with a stiff-tipped catheter. Underlying tracheal and bronchial mucosa is often erythematous, swollen and easily bruised.

Other causes of hemoptysis that must be excluded are necrotizing pneumonia (response A), severe tracheobronchitis (response B), tracheobronchial herpes (response C), pulmonary edema (response E), mycobacterial infection, pulmonary thromboembolism, pulmonary artery dissection from a pulmonary artery catheter, erosions from the endotracheal tube cuff, and innominate artery-tracheal fistula.

Of course, bleeding can also be due to underlying diseases such as Wegener’s granulomatosis, Goodpasture’s syndrome and other vasculitities, neoplasms, and disseminated intravascular coagulopathy.



III.20. D

机械通气咯血的通常的原因是用硬的吸痰管吸痰导致的损伤。下图所见的瘀斑和肿胀的红斑是由于用尖端比较硬的吸痰管插入气道吸痰的损伤。气管下和支气管粘膜通常都有红斑、肿胀、很容易擦伤。

咳血另外的原因要排除坏死性肺炎（A 选项）、严重的气管支气管炎（B 选项）、气管支气管疱疹（C 选项）、肺水肿（E 选项）、分支杆菌感染、肺栓塞、因肺动脉导管导致的肺动脉分流、（长期气管插管）气管导管口引起的气道溃烂，部位不明的气管动脉瘘。

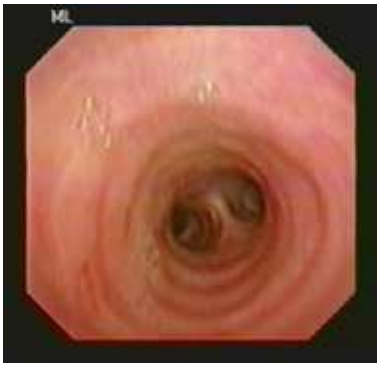
当然,以下疾病如韦格氏肉芽肿、肺出血-肾炎综合症、和其他血管炎、肿瘤，还有 DIC 等。

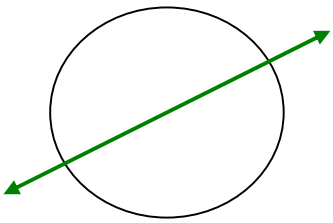
Created on 5/5/2011 6:55:00 PM

Answer III.21: E

The cross-sectional shape of the trachea is characterized by the ratio of transverse (separates trachea into front and back) and sagittal (separates trachea into left and right) diameters. Women tend to preserve a round configuration, while men tend to have some sagittal widening and transverse narrowing. The tracheal lumen changes dimensions depending on the phase of the respiratory cycle. For example, during coughing, intrathoracic pressure increases and becomes supra-atmospheric. This results in a narrowing of intrathoracic tracheal lumen as witnessed by decreased sagittal and transverse diameters.

The invagination of the posterior membrane can easily reduce the sagittal diameter to zero. Usually there should be no significant change in tracheal sagittal diameter during normal expiration because surrounding negative intrathoracic pressure supports airway patency. If there is intrathoracic tracheomalacia, expiratory collapse will occur, whereas extrathoracic tracheomalacia results in variable inspiratory obstruction, the major force opposing collapse being the upper attachment to the cricoid cartilage.





Transverse

III.21: E

气道的横断面是用横截面（从前后方向的气道切面）和矢状面（从左到右的气道切面）的直径。女性一般都保持圆形的结构，男性的气道一般是矢状面宽，横切面窄。气管腔面积随着呼吸周期改变。比如，在咳嗽过程中，气道内压增加，比大气压高。这导致镜下看到胸廓内气管腔变窄，表现为矢状面和横截面的直径减少。

后方（无软骨支撑）的薄壁凹陷很容易导致矢状面直径减少到 0。一般来说，在正常呼气过程中气道矢状面不会有很大的改变，因为气道周围的的胸腔负压可以使气道保持开放。如果胸内部分气道软骨软化就会导致气道呼气相塌陷，而胸外气道软化会导致可变性吸气相阻塞，对抗塌陷的主要力量来自于上气道软骨环。

Answer III.22: E

Routinely performing the bronchoscopic inspection in the same sequence in all patients is a good habit. The “normal” airways should be inspected first, leaving observations of abnormalities for last. By inspecting segmental bronchial anatomy in the same order, the bronchoscopist will never inadvertently overlook a segment. Many bronchoscopists leave the upper lobe bronchi for last because inspection of these segments can be more difficult, and because inspection of these segments often causes patients to cough. The habit of placing a hand on the chin while pushing down on the top of the head should be avoided because this maneuver can drive the odontoid process into the medulla oblongata. This is especially dangerous in patients with weakened C 1 vertebra such as that which occurs in trauma victims, in patients with bony erosion from metastases or primary tumor, and in patients with Paget’s disease, severe osteoporosis, or platybasia (softening of skull bones).

Rapid removal of the bronchoscope from the airway without a repeat inspection of the airways and subglottis is unwarranted. For trainees, it is great practice to remain in the midline up to and above the larynx. Lessons learned would come in handy the day one faces a difficult intubation! In addition, careful inspection may detect abnormalities not seen during bronchoscope insertion. These include subglottic strictures, vocal cord polyps or contact ulcers, small endobronchial abnormalities, and tracheosophageal fistulas. Administering additional topical anesthetic or conscious sedation agents because a patient is coughing or is increasingly anxious or combative can abolish any existing airway reflexes remaining for the patient. In addition, it may delay recognition of other problems such as drug reaction or mental status changes from hypoxemia, and prompt adverse events caused by excess medication.

Many patients can be “talked down” or soothed by a confident and gentle bronchoscopist and assistant. In others, it might be best to temporarily stop the procedure until the patient calms down. Improper bronchoscopy technique such as repeatedly scraping the bronchoscope against the bronchial wall, frequent suctioning, and repeated unsuccessful attempts to enter an upper lobe bronchus is often responsible for patient discomfort.

III.22: E

对于所有的患者进行气管镜检查都按相同的顺序是一个好习惯。先检查正常的气道，最后检查有异常的部位。按解剖结构，按相同顺序把每一部分的支气管都检查一遍，那么操作者不会漏掉每一个部分。许多操作者把上叶支气管留在最后检查，是因为检查这些部位通常都会引起咳嗽，因而检查比较困难。一只手托住患者下巴，另一只手按住额头的习惯必须改掉，因为这样会使到齿突碰到延髓，这种手法对于第一颈椎比较脆弱的患者尤其危险，比如那些有外伤的患者、原发肿瘤或者转移瘤引起骨质破坏的患者、Paget's 病的患者、严重骨质疏松的患者，或者颅底扁平症患者。

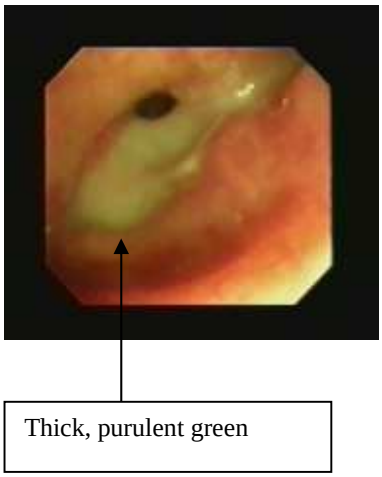
没有重复检查气道和声门下就很快地退出支气管镜是很不保险的。对于一个初学者来说，保持（气管镜）在喉头上方中线是需要练习很久的。这些练习会使你可以顺利地进行一个很难的进镜。另外，退镜时仔细的检查可以发现插入支气管镜时没有发现的异常，比如声门下狭窄、声带息肉、或者相关溃疡，小的支气管内膜异常、气管食道瘘等等。而因为患者咳嗽或者烦躁、焦虑而给予额外的局麻药和镇静剂会使患者仅有的气道反射也消失。而且这样会使延缓发现其他如药物反应、血氧不足引起的精神异常、药物过量引起的反转反应。

很多患者经过和耐心、温和的气管镜操作者及其助手交谈后可以增强信心并且安静下来。另外，可以暂停操作使患者安静下来。不熟练的气管镜操作技术，比如气管镜反复地摩擦气管壁，频繁地抽吸、反复尝试进入上叶支气管但是不成功都会使患者感到不适

Answer III.23 D

Purulent secretions can be yellow, green, white, or greenish-brown. Secretions can also be gray, blood-tinged, bloody, and black. As for all secretions, other descriptive terms include clear, milky, watery, thick, tenacious, scant, and abundant. Viscous means possessing viscosity, which is a property of a body by which flow occurs inside it. The term is inappropriately used in bronchoscopy reports.

Mucoid refers to a group of glycoproteins resembling mucin, as in normal secretions present in the cornea and in cysts. This is a descriptive term that is frequently used in bronchoscopy reports. Most readers understand that it describes secretions that are slightly tenacious, thick, and yet clear.



Created on 5/5/2011 6:55:00 PM

III.23 D

浓性分泌物可以是黄色、绿色、白色、褐绿色。分泌物可以是白色、淡红色、鲜红色、和黑色。对于分泌物，其他的描述词汇包括澄清、牛奶状、水样、稠的、粘稠、少量、大量等等。粘性是指具有粘度，是机体的组织（腐败物）经气流从身体内部（送到气管）。这个词用于支气管镜的报告是不合适的。

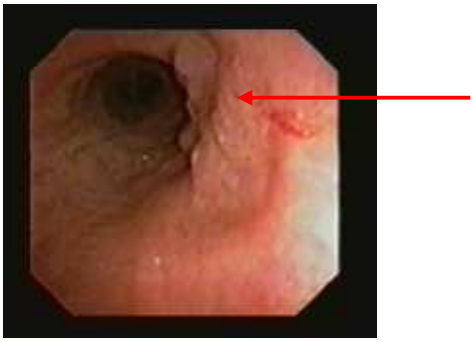
粘液状是指一团类似粘蛋白的糖蛋白，就像角膜和泪囊的正常分泌物。这个描述词汇经常用于支气管镜的报告。大多数阅读者都会理解它是描述分泌物比较粘稠、而且不澄清。

Answer III.24: A

The mucosa of the lateral wall of this bronchus is pale, raised and granular. It is difficult to assure a universal nomenclature for describing mucosal changes. The important thing is to develop a vocabulary for airway abnormalities that is constant, clear, and precise. As the operator, there should be a consistency in how you describe abnormalities. Misinterpretations should be avoided. Whenever possible, attach a photograph to the bronchoscopy report.

Use simple vocabulary. The location, size, and extent of each abnormality should be noted. Its impact on airway caliber and the degree of stenosis or airway narrowing should be estimated. Friability and texture (granular, waxy, shiny, thickened, swollen) should be noted, and concomitant findings (dynamic collapse, cartilaginous damage, focal, extensive or diffuse infiltration, or extrinsic compression) can be described. Lesions should be referred to as intraluminal (nodular, polypoid, or membranous) or extrinsic. Color might be important (pale, dark, brownish-black, white, yellow, greenish, red, purplish).

Airways might be inflamed, swollen or erythematous…but does not "inflamed," suggest swollen and erythematous? The bronchoscopy report should tell a story that everyone could read and understand the same way. Bronchial segments should be numbered and named. Lymph nodes sampled should be named and noted using the widely accepted ATS nodal station classification or the less widely accepted bronchoscopic classification system. In truth…it isn't easy.



Created on 5/5/2011 6:55:00 PM

III.24: A

这个支气管侧壁粘膜是苍白的粒状隆起，用一个普通的非医学术语来形容粘膜改变时很困难的。所以形成一套固定、清晰、准确的描述气道异常的词汇是很重要的。作为一个操作者，你需要固定你描述气道异常的词汇。这样避免一些误解。如果可以的话，最好在支气管镜报告单上附上检查时拍摄的图片。

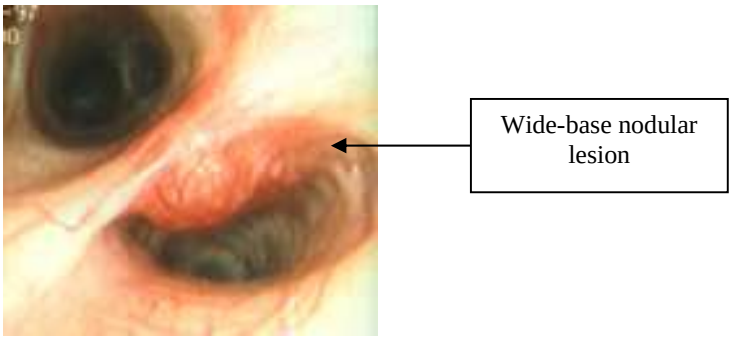
用最简单的词汇，病变的部位、大小、范围都要描述。病变对气道内径的影响，还有气道狭窄、狭窄的程度等都需要估计。脆性和质地（粒状、苍白、有光泽、增厚、肿胀等等）也需要描述，还有伴随的症状（动态塌陷、软骨破坏、广泛或者弥漫性病灶，或者外在压迫等）也需要描述。还有描述病变在气管腔内（结节状、息肉、膜状的）还是管腔外。颜色的描述也是很重要的（苍白、黑色、黑褐色、白色、黄色、绿色、红色、紫色等等）。

气道可能是红肿、肿胀、有红斑，但是不能用“发炎”暗示肿胀和红斑。支气管镜报告单需要讲一个大家都看得懂而且都能理解的“故事”。段支气管都要排序而且命名。取活检的淋巴结要命名而且用被广泛认可的 ATS 淋巴结分类标准或者相对没那么广泛接受的支气管镜分类系统来描述。说实在，这是很不容易的。

Answer III.25: B

A generally accepted, but infrequently referred to classification of bronchoscopic findings is that of the Japan Lung Cancer Society. In this classification, bronchoscopic findings are described as mucosal or submucosal. Early stage cancer is a mucosal histopathologic change. Polypoid tumors are described as tumors attached to the bronchial wall at their base only: a typical lesion extends into the airway lumen and moves with respiration.

A nodular tumor has a mound-like shape and also extends into the bronchial lumen. The surface of both polypoid and nodular lesions may be granular, engorged with capillary vessels, or covered with necrotic material.



III.25: B

一个被广泛接受，但是很少在支气管镜报告中使用的标准时日本肺肿瘤协会分类标准。这个标准，支气管镜下所见的病变分为粘膜和粘膜下。早期肿瘤是粘膜组织病理改变。息肉样肿瘤可以描述为基底附着于气道壁：一个突出到气管腔而且随呼吸运动的局部病变。

一个淋巴结肿瘤形状像一个土墩样突出到支气管腔。息肉样肿瘤或者淋巴结病变的 表面都是粒状的，有毛细血管充血，或者覆盖着坏死物。

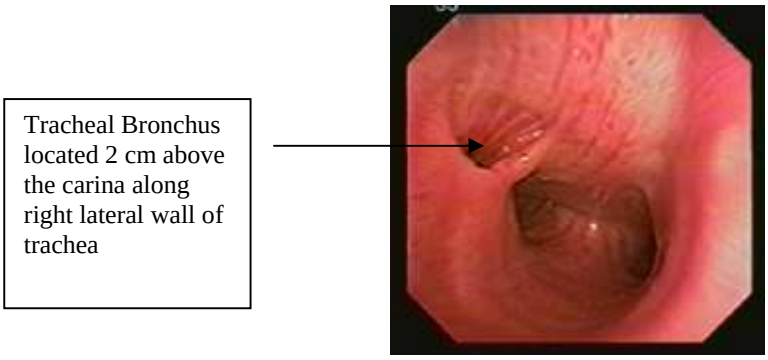
Created on 5/5/2011 6:55:00 PM

Answer III.26: B

The tracheal bronchus, also called “pig bronchus” because of its frequent presence in pigs, is usually a large developmental variation of the bronchial supply to an upper lobe, in this case, the right upper lobe bronchus. In humans, the tracheal bronchus is seven times more frequent on the right side of the trachea then the left. When it originates on the left, it is usually associated with other congenital abnormalities.

The tracheal bronchus can be seen in a many as 1% of individuals, although most authors cite a frequency of 0.25%. It is also seen in whales, giraffes, sheep, goats, and camels. In humans it is usually an incidental finding on bronchoscopy, chest radiograph, or computed tomography scan. When the orifice of the tracheal bronchus is relatively horizontal, recurrent episodes of aspiration, cough, bronchitis, and pneumonia may occur.

There are several types of tracheal bronchus. The rudimentary type is a blind pouch. There is the “displaced” bronchus, the most common variant, which supplies the apical segment of the right upper lobe. In this case, the segmental bronchi to this segment are missing within a regularly placed right upper lobe bronchus. The supernumerary supplies the right upper lobe in addition to a normal right upper lobe bronchus. Finally, there is the right upper lobe tracheal bronchus, which has three normal segmental bronchi, all arising above the main carina, but without a right upper lobe bronchus below the tracheal bifurcation.



Created on 5/5/2011 6:55:00 PM

III.26: B

气管性支气管也叫“支气管束”因为它们通常以束状出现的，是右上叶的支气管常见的较大的进展性的变异，下图的是右上叶支气管。在人类，右肺发生的气管支气管发生率比左肺多 7 倍。如果是左叶的变异，那么通常伴有其他先天性的异常。

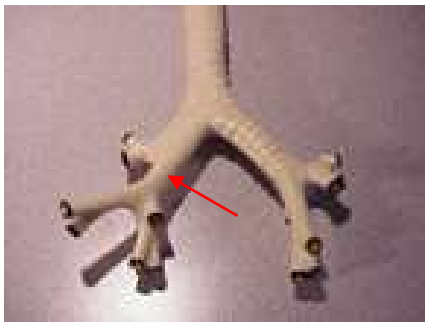
人类的气管性支气管大约有 1%是可以（肉眼）看到，但绝大部分作者都认为只能看到 0.25%。在鲸、长颈鹿、绵羊、山羊还有骆驼都可以看到。在人类这种异常通常在支气管镜检查、胸片、CT 检查时偶然发现的。由于气管性支气管的开口处是相对水平的。反复发作的误吸、咳嗽、支气管炎、肺炎都可能发生。

有 7 种气管-支气管变异。未发育完全的类型是一个（支气管）盲端。最常见的变异是“取代”支气管，连接右上叶根部。如下图的情况，段支气管消失，融合到右上叶气管性支气管中。在一个正常的右上叶上有一个多余的右上叶。最后，有一种气管性支气管，有三个正常的端支气管，（开口）均高于隆突，但是在气管分叉处没有右上叶支气管。

Answer III.27: E

The bronchus intermedius of the right bronchial tree is actually quite short, extending for 1.0-2.5 cm until its anterior wall extends into and becomes the middle lobe bronchus. Its posterior wall extends into and becomes the right lower lobe bronchus.

Volume loss caused by pleural effusion, radiation fibrosis, elevated right hemidiaphragm, as well as traction or torsion from a fibrotic or scarred right upper lobe often cause shortening of the bronchus intermedius.



Created on 5/5/2011 6:55:00 PM

III.27: E

右支气管树的中段支气管是比较短的，大约延伸 1.0-2.5 cm，在前壁分支为中叶支气管。它的后壁分支出右下叶支气管。

胸腔积液、放射性纤维化、右侧横隔抬高都会导致肺容量减少，而且由于右上叶的牵引和扭曲会导致支气管中段缩短。

Answer III.28: B

Bronchoalveolar lavage should never damage a bronchoscope. Passing a forceps, needle, or even a catheter, however, through the working channel of a flexible bronchoscope can easily damage it. The risk for damage increases when the instrument is forced through an acute angle formed by the bronchoscope as it enters the apical segment of an upper lobe bronchus. In these cases it is safer and easier to keep the tip of the bronchoscope at the entrance of the upper lobe bronchus, and to pass the forceps into the apical segment, watching it pass beyond the tip of the bronchoscope. If the bronchoscope needs to be wedged into the apical segment, it can be advanced gently over the forceps.

A bronchoscope can be damaged anytime it is inserted through an endotracheal tube, even when one assumes that a patient is paralyzed. Paralysis may be incomplete. Other times, bite blockers slip and the endotracheal tube becomes wedged between the teeth. Lubrication with silicone, xylocaine gel, or normal saline solution should be routine before inserting the bronchoscope into the endotracheal tube. Acute angles between the scope and the endotracheal tube at the scope's insertion site should be avoided. An assistant can be asked to hold the scope and endotracheal tube upright.

A bite block should be used whenever a flexible bronchoscope is inserted into the mouth, regardless of the patient's level of consciousness. Short, longitudinal bite blocks used to protect endotracheal tubes from patient biting slip easily. The full sized mouth bite block is a safer tool that can be firmly held in place by an assistant, or tied into place using an around-the-head Velcro strap. The bite block can usually be placed in the middle of the mouth, displacing the endotracheal tube to the corner of the mouth, or the bit block can be placed in the corner of the mouth, displacing the endotracheal tube towards the midline. On rare occasions, it might be necessary to untape the endotracheal tube in order to place the bite block over it inside the mouth.

Note that purple bite block is attached using Velcro bands

III.28: B

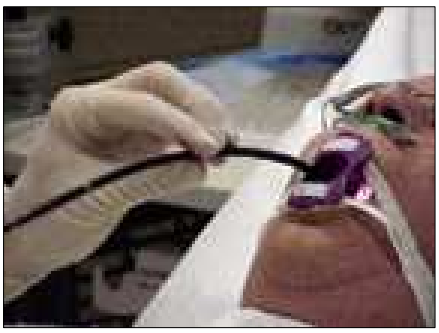
支气管肺泡灌洗从来不会损坏支气管镜。通过支气管镜的管道送入镊子、针、甚至导管，都会损坏支气管镜。当这些器具进入上叶的尖段时如果与支气管镜成锐角，损坏的机会会增加。在这

些情况下，保持支气管镜的尖端在上叶的开口，把镊子送入尖段，看着镊子通过支气管镜，这样会比较安全而且容易操作。如果支气管镜也要进入尖段，支气管镜要轻轻地经过镊子进入。

支气管镜在通过气管导管的时候是很容易损坏的，即使假定患者已经麻醉。即使麻醉的患者也是不够的。因为有时候防咬器滑脱，（你可以看到）牙齿之间的气管导管被咬成楔形。在支气管镜进入气管导管是要常规使用硅胶、利多卡因凝胶、一般的盐水润滑。应当避免支气管镜插入的部位，让气管导管和支气管镜成锐角。应该让助手扶镜，让支气管镜和气管导管保持竖直。

当纤维支气管镜进入口腔的时候，不管患者的意识水平如何，一定要使用防咬器。短的纵向的防咬器让患者没那么容易咬到气管导管。全尺寸的防咬器是更安全，助手可以把一个防咬器放在口中，并用胶布绕过枕部再连接防咬器，从而达到良好固定。防咬器可以放在口腔中部，气管导管放在嘴角，或者防咬器放在嘴角，气管导管放在中线上。有时需要用胶布把气管导管固定在防咬器中，一起放进口腔。

紫色的防咬器用胶布固定着



Created on 5/5/2011 6:55:00 PM

Answer III.29: D

BAL has not been shown to cause pulmonary infections, although radiographic infiltrates may be visible for up to 24 hours after a procedure. For this reason, experts advocate obtaining radiographic studies prior to BAL rather than afterwards, when the presence of an infiltrate within a lobar segment that has been lavaged may erroneously be considered pathologic.

Most experts keep patients under observation for up to 2 hours after BAL. In the presence of dyspnea or bronchospasm, inhaled bronchodilators are usually administered. Supplemental oxygen is routine until arterial saturation has returned to baseline or is normal on room air. Patients should be warned about the possibility of delayed onset fever, chills, or myalgias. In this event, Patients should be instructed to take an antipyretic or other anti-inflammatory for symptomatic relief.

III.29: D

BAL 没有发现过会导致肺部感染的，虽然灌洗后 24 小时会出现浸润等影像学改变。由于这个原因，专家推荐在 BAL 前就做影像学检查，而不是 BAL 之后，当一个灌洗后的肺段出现浸润影就有可能错误的认为是病理改变。

多数专家都会在 BAL 后继续观察患者 2 小时，在呼吸困难或者支气管痉挛的时候，通常要吸入支气管扩张剂。常规吸氧直到氧饱和度回到基线（灌洗前水平？）或者吸空气下饱和度正常。要事先告知患者会有迟发的发热、寒战或者肌痛。在这些情况下，要指导患者服退烧药或者其他的缓解症状的抗炎药。

Answer III.30 E

Bronchoscopy plays a major role in lung cancer staging. One of the reasons for performing an “inspection” bronchoscopy in all patients with diagnosed bronchogenic carcinoma is because discovery of occult vocal cord paralysis, an ipsilateral or contralateral endobronchial metastasis, or involvement of and near the main carina alters therapeutic management and prognosis.

Discovering a lesion that obstructs the central airways might prompt endoscopic resection in order to decrease chances for post obstructive pneumonia, improve symptoms such as dyspnea and cough, and increase ventilatory function and exercise tolerance.

Often, a lesion that appears to obstruct a main bronchus and require pneumonectomy is actually originating from within a lobar bronchus and extending into the main bronchus without main bronchial wall involvement. In these cases, lobectomy or sleeve resections are possible instead of pneumonectomy. In addition, clinical Tumor stage is affected since patients might no longer have a tumor “within two centimeters of the main carina”.

III.30 E

支气管镜对于肺癌分期有很重要的作用。要为所有的诊断支气管癌的患者行支气管镜检查的原因是如果发现声带麻痹、同侧或者对侧的支气管转移、侵犯隆突、或者隆突附近转移都会改变治疗方案和预后。

发现阻塞中央气道的病变要马上内镜下切除，以减少阻塞性肺炎的发生，改善呼吸困难、咳嗽等症状，提高通气功能和运动耐量。

通常，一个阻塞主支气管需要切除的病变实际上是起源于叶支气管，延伸到主支气管但是没有浸润到主支气管壁。在这种情况下，肺叶切除或者“袖套样”切除术就可以了，无需全肺切除。另外，在临床上如果患者有隆突下 2cm 内的浸润灶，那么分期将受影响。

Created on 5/5/2011 6:55:00 PM

模块 Ⅲ

阶段测试

阶段测试 模块Ⅲ

Post test instructions

The following test is designed to verify that you have completed and fully understood the 30 questions for Module Ⅲ.

回顾性测试指引：

下列检测是为了证实你已经完成并充分理解了模块Ⅲ的 30 个问题中所包含的所有知识内容。

Post module test questions and answers: Module 3

Question 1: Which of the following best describes Midazolam

A. Ten times more potent than diapepam
B. Sedation and anxiolysis usually occurs within 2 minutes of administration
C. Complete recovery of motor performance and consciousness often takes two hours
D. Risk for apnea is greatest when used alone compared to when used with other sedating agents.
E. Larger doses can cause seizures even in healthy patients

Question 2: Repeated trauma to the larynx during attempts at bronchoscopically-assisted endotracheal intubation most likely to cause which of the following?

A. Laryngospasm, vomiting, and cardiac arrhythmias
B. Hoarseness, vocal cord paralysis, and arytenoid luxation
C. Laryngeal edema, aspiration, and fever
D. Pain, gagging, and diarrhea

Question 3: When using Gluteraldehyde for high-level disinfection, a 10 minute immersion results in which of the following

A. 50% eradication of mycobacteria
B. 85% eradication of mycobacteria
C. 99.8% eradication of mycobacteria
D. Complete eradication of mycobacteria

Question 4: All of the following statements about scattered radiation are correct EXCEPT ?

A. It is caused by increased voltage
B. It can be reduced by decreasing the anode tube milliamperage
C. It decreases the quality of the fluoroscopic image.
D. It is caused by increased tissue thickness

Question 5: All of the following statements about topical Lidocaine are true EXCEPT ?

A. The maximum dose recommended for flexible bronchoscopy is about 300 mg.
B. Systemic effects include restlessness, seizures, numbness, and hypotension.
C. It is less potent but longer acting than Tetracaine.
D. Peak concentration is usually reached within 30 minutes of airway application.

Question 6: Which of the following statements best relates to patients with a saber-sheath trachea?

A. It may be found in up to 5 percent of elderly men.
B. The majority of patients with saber sheath trachea also have asthma
C. It is characterized by an increased transverse distance and decreased sagittal diameter of the trachea..
D. Differential diagnosis might include extrinsic compression, relapsing polychondritis, wegener's Granulomatosis, and Klebsiella Rhinoscleromata.

Question 7: All of the following statements describing the "proper" way to dictate or write a bronchoscopy note are correct EXCEPT?

A. Consistently use the same concise and precise terminology.
B. Tell a story that everyone can read and understand the same way .
C. Consistently comment on airway patency, mucosal appearances, secretions, and location of specimens obtained.
D. Referring to the amount and effects of conscious sedation can usually be avoided.

Question 8: The bronchus intermedius usually measures

A. Less than 1.0 cm.
B. More than 2.5 cm.
C. Between 1.0 and 2.5 cm.
D. It is a misnomer because it immediately becomes the middle lobe and lower lobe bronchus.

Question 9: All of the following statements about bronchoalveolar lavage are true EXCEPT ?

A. Delayed onset fever, chills and myalgias are best treated with an antipyretic or other anti-inflammatory medication.
B. Radiographic infiltrates in the area of lavage are rarely visible after the procedure.
C. BAL may cause or increase hypoxemia
D. Careful technique is essential to obtain a true alveolar sample rather than a simple bronchial wash.

Question 10: Which of the following statements about oral airways is MOST correct?

A. They help keep the scope in the midline, facilitating exposure of laryngeal structures.
B. They help maintain an open pharynx and larynx.
C. They prevent the patient from biting the bronchoscope.
D. They facilitate maneuverability of the scope and endotracheal intubation.

模块 3 模块后测试题
问题 1:下列哪一项对咪达唑仑的描述是正确的？

A 作用比地西泮强 10 倍
B 镇静和抗焦虑通常在使用后 2 分钟出现
C 功能和意识的完全恢复大约要 2 小时
D 与其他镇静剂相比，呼吸暂停的风险最高。
E 在健康人中大剂量会导致癫痫
问题 2 在支气管镜引导下气管插管引起喉头反复损伤最可能引起以下哪种情况
A 喉痉挛、呕吐、心律失常
B 嘶哑、声带麻痹和杓状软骨脱臼
C 喉头水肿、误吸、发热
D 疼痛、哽喉、和腹泻
问题 3 当用戊二醛进行高规格消毒时，10 分钟可以做到以下哪一项
A 消灭 50%的分枝杆菌
B 消灭 85%的分枝杆菌
C 消灭 99.8%的分枝杆菌
D 完全消灭所有的分枝杆菌
问题 4 以下关于散射的说法哪一项是正确的
A 由于电压增加而产生
B 减少阳极管电流可以减少
C 可以使透视图像的质量下降
D 由于组织厚度增加而产生
问题 5 以下哪一项关于局麻药利多卡因的说法是错误的
A 为纤支镜操作前局麻的推荐最大剂量为 300mg
B 全身症状包括烦躁不安、癫痫、麻木、低血压
C 效价比丁卡因差，但是作用时间比丁卡因长
D 高浓度的气道局麻作用时间达到 30 分钟
问题 6 以下哪一项关于剑鞘样气道患者描述是正确的
A5%的老年人有这种表现
B 大多数剑鞘样气道患者患哮喘
C 这种气道的特点是横断面直径增加，矢状面直径减少
D 鉴别诊断包括了气道外压迫、复发性软骨炎、韦格氏肉芽肿、克雷伯氏菌鼻硬结病
问题 7 以下哪一项关于正确口头报告支气管镜结果或者写支气管镜报告的说法是错误的
A 统一使用相同的简洁而且准确的词汇
B 用同样的方式去叙述每一个人都能读懂的“故事”
C 统一使用相同的词汇去描述气道通畅情况、黏膜外观、分泌物和取活检部位
D 关于镇静剂的剂量和效果通常可以略去。
问题 8 支气管中间段一般长度为
A 小于 1cm
B 大于 2.5cm
C 在 1cm 和 2.5cm 之间

D 这是一个错误的称呼，因为它马上就分支为中叶和下叶支气管。
问题 9 以下哪一项关于支气管肺泡灌洗的说法是错误的
A 迟发性发热，寒战、肌痛最好使用退热药和其他抗炎药治疗
B 灌洗后影像学检查很少发现灌洗区有渗出影。
C BAL 可能引起或者加重低氧血症
D 认真的检查对取得真正的肺泡标本比灌洗更重要的
问题 10 以下对于人工口咽气道的描述最准确的是
A 他们可以使气管镜保持在气道中线，方便暴露咽喉
B 可以帮助维持一个开放的咽喉
C 防止患者咬支气管镜
D 使支气管镜操作和气管插管更便利

Congratulations, you have completed Module III of the Essential Bronchoscopist©. The correct answers to the post test questions are listed below. We suggest that you review the questions and answer sets to Module III. You may do so by printing out the entire module as a PDF file.

ANSWERS TO MODULE III POST-TEST

Answer 1: A
Answer 2: A
Answer 3: C
Answer 4: B
Answer 5: C
Answer 6: A
Answer 7: D
Answer 8: C
Answer 9: B
Answer 10: A

恭喜你完成了 Essential Bronchoscopist©模块 III 的测试，以下的是测试后问题的正确答案，我们推荐你重新把模块 III 的问题和答案对一遍，你可以把整个模块用 PDF 文件的形式打印出来对答案。

答案 1: A
答案 2: A
答案 3: C
答案 4: B
答案 5: C
答案 6: A
答案 7: D
答案 8: C
答案 9: B
答案 10: A

恭喜您，您已完成全部课程。
祝愿您在介入肺脏病学习的道路上取得更大成绩！