·诊疗方案·

成人诊断性可弯曲支气管镜检查术应用指南（2019年版）

中华医学会呼吸病学分会介入呼吸病学学组
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【摘要】 可弯曲支气管镜检查术是呼吸系统疾病临床诊断和治疗的重要手段，临床应用广泛。本指南是在综合国内外相关文献的基础上，参照国内外相关指南的相关内容，对国内既往指南的内容进行了较多的补充和更新，其目的是规范成人支气管镜检查术的操作，提高疾病的诊断率，降低相关不良风险，减少操作相关的并发症。

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可弯曲支气管镜（包括纤维支气管镜、电子支气管镜，以下简称支气管镜）检查术是呼吸系统疾病临床诊断和治疗的重要手段，临床应用广泛。“成人诊断性可弯曲支气管镜检查术应用指南（2019年版）”（以下简称指南）是在综合国内外相关文献的基础上，按照循证医学的证据等级对相关研究证据进行了分级（表1）。参照国外相关指南的相关内容，对中华医学会呼吸病学分会2008年制定的“诊断性可弯曲支气管镜应用指南（2008年版）”的内容进行了较多的补充和更新。本指南的目的是规范成人支气管镜检查术的操作，提高疾病的诊断率，降低相关不良风险，减少操作相关的并发症。本指南不涉及以治疗为目的的支气管镜操作。由于硬质气管支气管镜也可用于气管支气管的检查，但其技术迥异于可弯曲支气管镜，且以治疗目的为主，故不在本指南阐述的范畴。

一、支气管镜检查术的适应证及禁忌证

（一）适应证

支气管镜检查术作为临床常用技术，适应证范围非常广泛，对于呼吸系统疾病具有广泛的诊断价值，其中下列情况行支气管镜检查术可显著获益。

1. 疑诊气管、支气管、肺脏肿瘤或肿瘤性病变需要确定病理分型，或确定浸润范围及分期时，应行支气管镜检查术[2-6]（推荐等级B）。鉴于近年来

表1　证据级别及推荐等级[1]

证据级别	证据类型
1++	随机对照试验高质量的荟萃分析、系统评价，或偏倚可能性很小的随机对照试验
1+	随机对照试验质量较高的荟萃分析、系统评价，或偏倚可能性小的随机对照试验
1−	随机对照试验的荟萃分析、系统评价，或偏倚可能性大的随机对照试验
2++	病例对照或队列研究的高质量系统评价，或出现混杂、偏倚和机遇可能性很小而反映因果关联可能性大的、高质量病例对照或队列研究
2+	出现混杂、偏倚和机遇可能性小而反映因果关联可能性较大的、较高质量的病例对照或队列研究
2−	出现混杂、偏倚和机遇可能性大而反映因果关联可能性明显不足的病例对照或队列研究
3	非分析性研究，即病例报告、系列病例分析
4	专家意见
推荐等级	**推荐类型**
A	直接适用于目标人群的1++或1+级证据
B	直接适用于目标人群的2++级证据，1++或1+级证据的外推证据
C	直接适用于目标人群的2+级证据，2++级证据的外推证据
D	3或4级证据，2+级证据的外推证据

肺癌靶向治疗、免疫治疗的进展，支气管镜检查术也适用于对肿瘤进行分子病理学诊断和评价，在治疗过程中对病变再活检以对组织病理类型可能的变化及可能继发的基因突变进行评价，以指导后续治疗[7-10]（推荐等级C）。

2. 不明原因咯血持续1周以上的患者，尤其是年龄在40岁以上，即使影像学未见明显异常，仍应行支气管镜检查术以明确出血部位及出血原因[11-15]（推荐等级C）。

3. 对于不能明确诊断、进展迅速、抗菌药物效果欠佳、病变持续存在或吸收缓慢、临床诊断为下呼吸道感染或伴有免疫功能受损的患者，应行支气管镜检查术，并采样行相关病原学检查及某些病原标志物检测，有助于临床的正确诊断或病原学诊断[16-24]（推荐等级C）。

4. 器官或骨髓移植后新发肺部病变，或者疑诊移植物抗宿主病、移植肺免疫排斥时，建议行支气管镜检查术协助明确病因[25-27]（推荐等级D）。

5. 临床上难以解释、病情进展或治疗效果欠佳的咳嗽患者，怀疑气管支气管肿瘤、异物或其他病变者，建议行支气管镜检查术[28-29]（推荐等级D）。

6. 原因不明的突发喘鸣、喘息，尤其是固定部位闻及鼾音或哮鸣音，需排除大气道狭窄或梗阻时，建议行气管镜检查术[30]（推荐等级D）。

7. 对于原因不明的弥漫性肺实质疾病，如间质性肺炎、结节病、肺泡蛋白沉积症及职业性肺病等，均建议行支气管镜检查术进行诊断和鉴别诊断[31-33]（推荐等级D）。

8. 对于可疑气道狭窄的患者，支气管镜检查术是重要的诊断和评价狭窄程度、长度、类型及病因的方法，为进一步治疗提供依据[34]（推荐等级D）。

9. 对于任何原因引起的单侧肺、肺叶或肺段不张，均建议行支气管镜检查术以明确诊断[35-36]（推荐等级D）。

10. 外伤后可疑气道损伤的患者，推荐行支气管镜检查术，以利于明确诊断并评估损伤部位、性质和程度[37-38]（推荐等级D）。

11. 临床症状及影像学表现怀疑各种气管、支气管瘘，如气管食管瘘、支气管胸膜瘘等，均推荐行支气管镜检查术，以确定其病因、部位、大小及类型[39-41]（推荐等级D）。

12. 临床怀疑气道异物者，建议行支气管镜检查术，以确定诊断，评估取出难度，决定治疗方案[42-44]（推荐等级D）。

13. 原因不明的纵隔淋巴结肿大、纵隔肿物等，应行支气管镜检查术，获取病理学标本，进行诊断[45-47]（推荐等级C）。

（二）禁忌证

可弯曲支气管镜检查术应用至今，已积累了丰富的临床经验，目前无绝对禁忌证，其相对禁忌证范围亦日趋缩小。但下列情况行支气管镜检查术时发生并发症的风险显著高于一般人群，检查前应慎重权衡利弊。

1. 急性心肌梗死后4周内不建议行支气管镜检查术；急性心肌梗死后4~6周内若需行支气管镜检查术，建议请心内科医生会诊，充分评估其发生心脏病的风险[48-50]（推荐等级D）。

2. 活动性大咯血时行支气管镜检查术风险较高，若必须行支气管镜检查术时，应做好建立人工气道及急救的准备，以应对出血加重可能导致的窒息[51-52]（推荐等级D）。

3. 血小板计数<20×10^9/L时不推荐行支气管镜检查术。血小板计数<60×10^9/L时不推荐行支气管镜下黏膜活检或经支气管肺活检[53-55]（推荐等级D）。

4. 妊娠期间不推荐行支气管镜检查术，若病情需要，除非紧急情况，则尽量推迟至分娩或妊娠28周以后进行，并提前与妇产科医生充分沟通，评估风险[56]（推荐等级D）。

5. 恶性心律失常、不稳定心绞痛、严重心肺功能不全、高血压危象、严重肺动脉高压、颅内高压、急性脑血管事件、主动脉夹层、主动脉瘤、严重精神疾病以及全身极度衰竭等，并发症风险通常较高，若必须行支气管镜检查术时需权衡利弊，应做好抢救准备（推荐等级D）。

二、支气管镜检查术的术前准备及特殊患者的注意事项

（一）患者的告知及知情同意

1. 将支气管镜检查术过程中可能出现的问题向患者提供口头或书面指导，可以提高其对操作的耐受性[57-62]（推荐等级C）。

2. 所有患者在接受检查前需书面告知相关风险，并签署知情同意书[63-66]（推荐等级D）。

（二）术前准备

1. 检查前根据病情，必须拍摄正位X线胸片，或者正侧位X线胸片，或者胸部CT。推荐行胸部CT检查，以便于更精准确定病变部位，有助于决定采样部位及方式[67-70]（推荐等级D）。

2. 若无胃肠动力异常或梗阻，局部麻醉时应在支气管镜检查术前 4 h 开始禁食，术前 2 h 开始禁水；全身麻醉时应在支气管镜检查术前 8 h 开始禁食，术前 2 h 开始禁水[71-76]（推荐等级 B）。

3. 检查前建议建立静脉通道，以方便术中给予镇静及其他药物，并保留至术后恢复期结束[77]（推荐等级 D）。

4. 在检查前不应常规应用抗胆碱能药物（如阿托品等）。该类药物缺乏临床获益证据且存在血流动力学不稳定的潜在风险[78-82]（推荐等级 A）。

5. 对于拟行支气管镜检查术的患者，建议行凝血酶原时间、部分凝血活酶时间、血小板计数检查，以除外严重凝血功能异常[83-85]（推荐等级 D）。

6. 根据“中华人民共和国传染病防治法”、“艾滋病防治条例”及“软式内镜清洗消毒技术规范”等法律法规，检查前应筛查血源性传播疾病，防止医源性感染（推荐等级 D）。

7. 对于有心脏病病史及其危险因素的患者，检查前应行心电图检查[86-87]（推荐等级 D）。

8. 对于拟行活检的患者，推荐提前 5~7 d 停用氯吡格雷，提前 3~5 d 停用替格瑞洛，小剂量阿司匹林可继续使用[54-55,77-88]（推荐等级 C）。

9. 对于需提前停用氯吡格雷或替格瑞洛的患者，若植入冠状动脉药物涂层支架未满 12 个月或植入冠状动脉金属裸支架未满 1 个月，则应与心内科医生沟通，共同权衡抗血小板药物使用的利弊；若抗血小板药物治疗方案为氯吡格雷或替格瑞洛联合小剂量阿司匹林，则改为单用小剂量阿司匹林；并于操作第 2 天晨起恢复氯吡格雷或替格瑞洛的使用[55,89-90]（推荐等级 D）。

10. 对于拟行活检的患者，推荐提前 5 d 停用华法林。若术后无明显活动性出血，可在支气管镜检查术后 12~24 h 恢复使用，即操作当天夜里或第 2 天晨起恢复使用[55,77,89-90]（推荐等级 D）。

11. 对于需提前停用华法林的患者，可评估停药期间血栓形成风险（表 2）。若为低风险，则停药期间无需替换为低分子肝素；否则，应替换为低分子肝素抗凝，并于支气管镜操作前 24 h 停药。恢复华法林使用后仍应继续同时使用低分子肝素直至 INR 达到治疗范围[55,89-90]（推荐等级 D）。

12. 对于拟行活检的患者，达比加群酯及利伐沙班需提前 24 h 停药，不需用低分子肝素替换[89-90]（推荐等级 D）。

13. 对疑诊慢性阻塞性肺疾病的患者推荐进行肺功能检查，若通气功能重度减退（FEV_1 占预计值%<40%），建议进行动脉血气分析[91-92]（推荐等级 D）。

14. 慢性阻塞性肺疾病及支气管哮喘患者在支气管镜检查术前应预防性使用支气管舒张剂[93-97]（推荐等级 B）。

15. 吸氧可能升高 $PaCO_2$，因此对于支气管镜检查术前 $PaCO_2$ 已升高者，操作中吸氧可能进一步提高 $PaCO_2$，应警惕，但不需要术前常规进行吸氧试验确定呼吸中枢的敏感性[98-100]（推荐等级 D）。

16. $PaCO_2$ 升高并非静脉应用镇静剂的绝对禁忌证，应充分告知患者及其家属、支气管镜检查医生和麻醉医生存在的潜在风险，应谨慎用药并进行密切监测[99-101]（推荐等级 D）。

17. $PaCO_2$ 升高的患者接受支气管肺泡灌洗术可能导致 $PaCO_2$ 进一步升高，但术后多可自行恢复[100,102]（推荐等级 D）。

（三）支气管镜检查术的镇静和麻醉

1. 如无禁忌证，应常规给予患者镇静剂[103-110]（推荐等级 B）。

2. 推荐短效苯二氮䓬类镇静剂咪达唑仑为操作中清醒镇静的首选药物[74,111-118]（推荐等级 C）。

3. 咪达唑仑的具体使用方法：（1）70 岁以下患者的初始剂量推荐为 0.05 mg/kg（不宜超过 3 mg），70 岁以上患者则初始剂量不宜超过 2 mg。在操作开始前 5~10 min 给药，注射后约 2 min 起效；（2）咪达唑仑静脉注射应缓慢，约 1 mg/30 s；（3）如果操作时间长，必要时每次可追加 0.5~1.0 mg，但总量不宜超过 10 mg。年龄>70 岁、衰弱及慢性病患者应适当减量；（4）本药作用存在较大个体差异，应综合分析患者具体情况，个体化给药[77,112-113,115-116,119-124]（推荐等级 D）。

表 2　血栓形成低风险情况

下肢深静脉血栓或肺栓塞	下肢深静脉血栓或肺栓塞形成已超过 12 个月，且无易栓症或恶性肿瘤等其他血栓形成的高危因素
房颤	CHADS2 评分[a]为 0~2 分且无脑卒中或短暂性脑缺血发作病史
心脏机械瓣置换术后	主动脉瓣置换术后，且无房颤及其他脑卒中高危因素（包括糖尿病、高血压、年龄>75 岁等）

注：[a]CHADS2 评分为房颤血栓风险评分，其中心功能不全、高血压、年龄>75 岁、糖尿病各为 1 分，脑卒中为 2 分

4. 丙泊酚镇静效果与咪达唑仑相当，部分研究结果显示患者满意度甚至优于咪达唑仑。但其治疗窗较窄，建议由麻醉科医生或有经验的医生密切进行监测，根据情况随时调整给药速度[113,115-116,118,125-126]（推荐等级C）。

5. 阿片类药物（如芬太尼、舒芬太尼、瑞芬太尼等）可与咪达唑仑、丙泊酚、右美托咪定联合使用，以提高患者对操作的耐受性。操作结束时可根据临床情况积极给予拮抗剂。由于此类药物个体差异大，特别是联合用药时呼吸抑制风险增高，建议由麻醉科医生在监测下给药[116,118,123,125,127]（推荐等级B）。

6. 右美托咪定单药或联合阿片类药物应用可取得良好的镇静效果。多数研究结果提示其镇静效果、患者及支气管镜操作者满意度、脉搏氧饱和度维持等方面均优于咪达唑仑或丙泊酚，但存在苏醒时间延长、血流动力学不稳定等风险。目前推荐由有经验的医生使用；推荐用法为10~15 min静脉泵注右美托咪定0.5~1 μg/kg，维持速度为0.2~0.7 $\mu g \cdot kg^{-1} \cdot h^{-1}$[128-132]（推荐等级C）。

7. 局部麻醉首选利多卡因，且鼻部麻醉推荐使用2%利多卡因凝胶[133-137]（推荐等级A）。

8. 行咽喉部麻醉时，推荐使用1%利多卡因喷雾，支气管镜通过声带前应局部给药[77,138-144]（推荐等级A）。

9. 行气道麻醉时，首选利多卡因。但因雾化给药气道麻醉效果差，且因药物泄露而导致药物经眼结膜吸收，出现不良反应的比例较高，同时增加利多卡因总用量，故不推荐使用雾化给药方式[138-141,145]（推荐等级C）。

10. 经支气管镜注入利多卡因时，应尽可能减少其用量，以避免心律失常、惊厥等并发症。推荐最大剂量不超过6~7 mg/kg。对于老年患者、肝功能或心功能损害的患者，使用时应适当减量[139,146-150]（推荐等级C）。

三、支气管镜检查术的术中监护及操作

（一）术中监护及并发症的处理

1. 推荐术中常规监测患者的脉搏氧饱和度[96-98]（推荐等级C）。

2. 术中宜监测患者的心率、心律、呼吸频率及血压[151-154]（推荐等级D）。

3. 有条件时推荐持续监测呼气末二氧化碳分压，其对于呼吸抑制的发现早于脉搏氧饱和度的下降（推荐等级D）。

4. 支气管镜检查室建议配备气管插管及心肺复苏的药品、器械及设备[77]（推荐等级D）。

5. 低氧为支气管镜检查术的常见并发症，但多数呈一过性，通过吸氧易于纠正。推荐术中通过鼻、口或人工气道吸氧。当脉搏氧饱和度明显下降（即SpO_2绝对值下降>4%，或SpO_2<90%）并持续超过1 min时，应积极提高吸氧浓度，必要时停止支气管镜操作，以减少低氧相关损伤的发生[155-158]（推荐等级C）。

6. 支气管镜检查术中，应监测镜下出血情况，可根据表3判断出血程度，并给予相应处理[77]（推荐等级D）。

表3　支气管镜操作中出血程度分级及相应处理方式

出血程度	相应处理
无出血	无需持续吸引，出血可自发停止
轻度出血	需持续吸引，出血可自发停止
中度出血	需以支气管镜阻塞活检的叶段支气管，局部使用肾上腺素或冰盐水止血
重度出血	需放置支气管阻塞球囊或导管、外科介入，使用全身凝血剂
极重度出血	可导致输血、窒息、插管、心肺复苏或者死亡，需进入重症监护室

7. 支气管镜检查术后气胸的总体发生率约为0.1%。但经支气管肺活检（transbronchial lung biopsy，TBLB）后气胸发生率可达1%~6%，但TBLB术后无需常规行胸片检查。若患者出现相关症状，临床怀疑气胸时则应尽快拍摄胸片以确定或排除诊断[159-163]（推荐等级C）。

8. 支气管镜检查术前预防性使用抗菌药物并无获益，即使对有脾切除、感染性心内膜炎病史患者等特殊情况也不例外[164-170]（推荐等级C）。

9. 支气管镜检查术所致菌血症的发生率约为6%。术后部分患者可因肺泡巨噬细胞释放的某些炎性介质出现一过性发热，其发生率约为5%~10%，通常不需要进行特殊处理，但应与术后感染进行鉴别[164,166-167,169]（推荐等级D）。

（二）诊断性支气管镜检查术操作的实施标准

1. 对于镜下所见新生物活检时，如无特殊情况，5块活检标本可满足病理免疫组织化学染色及基因检测需要，保证诊断率[171-176]（推荐等级B）。

2. 对于镜下所见支气管黏膜呈浸润性病变或高度怀疑肿瘤时，推荐联合进行活检、刷检和冲洗，且应在其他操作后进行冲洗，以提高阳性率[171,173,177-182]（推荐等级B）。

3. 高度怀疑肿瘤或癌前病变时，有条件者可考虑在普通光支气管镜检查的基础上结合荧光支气管镜或窄谱成像支气管镜检查，以提高发现病变的敏感度[171,183-184]（推荐等级 D）。

4. 对于支气管腔外病变，推荐经支气管针吸活检（transbronchial needle aspiration，TBNA）或支气管腔内超声引导下的经支气管针吸活检（endobronchial ultrasound-transbronchial needle aspiration，EBUS-TBNA）以提高阳性率。传统 TBNA 操作时可进行快速现场评价（rapid on-site evaluation，ROSE）以减少穿刺针数、评估样本中肿瘤细胞数量及质量。研究结果表明，ROSE 可降低传统 TBNA 的并发症，但并不影响诊断率[45-47,185-193]（推荐等级 C）。

5. 周围型肺部病变患者行活检时，建议应用 X 线透视、电磁导航、虚拟导航、径向支气管内超声、超细支气管镜等手段，以提高诊断阳性率[171,194-200]（推荐等级 C）。

6. 弥漫性肺部病变患者行活检时，无需常规应用 X 线透视[201-206]（推荐等级 B）。

7. 对弥漫性肺部病变患者进行 TBLB 时，推荐尽可能从一侧肺取 4~6 块标本，不推荐同时进行双侧肺活检，以避免双侧同时出现严重并发症，导致治疗困难，或无法判断严重并发症的部位而影响紧急处置[201-203,207]（推荐等级 C）。

8. 对弥漫性肺部病变或外周型病变患者，经支气管冷冻肺活检可提供更大、质量更高的组织样本，特别是避免了 TBLB 时对组织的挤压，造成病理判读上的困难。但本操作可能增加气胸及严重出血的风险，推荐在全身麻醉或深度镇静下通过硬质气管支气管镜或气管插管进行[208-213]（推荐等级 D）。

9. 对疑诊结节病的患者，推荐进行黏膜活检、TBLB 联合支气管肺泡灌洗液的 CD_4^+/CD_8^+ 比例检测。若纵隔淋巴结增大，还可考虑联合 TBNA 或 EBUS-TBNA 以增加诊断阳性率[214-221]（推荐等级 C）。

10. 对免疫功能受损的患者，若存在肺部浸润影，推荐常规行支气管镜检查术，进行刷检、支气管肺泡灌洗术及 TBLB，获取标本进行病原学检测，特别是分枝杆菌、真菌（包括肺孢子菌）和病毒（尤其是巨细胞病毒）检测[222-237]（推荐等级 C）。

11. 我国为结核病高流行地区，支气管镜检查术获取的标本推荐常规进行抗酸杆菌检测；高度怀疑结核分枝杆菌感染的患者推荐常规进行结核分枝杆菌培养，并于支气管镜检查术后常规进行痰标本的相关检查[238-247]（推荐等级 C）。

12. 对疑诊侵袭性肺曲霉病的患者，应进行支气管肺泡灌洗液镜检及真菌培养；应进行支气管肺泡灌洗液半乳甘露聚糖（galactomannan，GM）测定，该项检查对肺曲霉病的诊断具有较高的敏感度和特异度；由于活检出血风险较高，应根据临床情况权衡利弊，确定是否行 TBLB 和（或）黏膜活检[248-256]（推荐等级 C）。

13. 对于疑诊社区获得性肺炎的患者，疗效不佳或病情迅速进展时，建议在条件许可的情况下进行支气管肺泡灌洗液嗜肺军团杆菌聚合酶链式反应（polymerase chain reaction，PCR）和其他常见病原体的相关检测[257-265]（推荐等级 D）。

四、在重症监护室实行的支气管镜检查术

1. 重症监护室患者行支气管镜检查术并发症的发生率高于一般患者[266-268]（推荐等级 D）。

2. 支气管镜检查过程中及检查后，应对患者进行连续的多导生命体征监测[269-275]（推荐等级 D）。

3. 对于需呼吸机（包括无创呼吸机及有创呼吸机）辅助通气的患者应采取积极措施，如提高吸入氧浓度，将支气管镜通过三通接口插入气管导管内，保证支气管镜检查术过程中维持足够的通气和氧合[269,271,276-279]（推荐等级 D）。

4. 有以下情况的患者进行操作的风险较高，检查前需谨慎权衡利弊：（1）机械通气时呼气末正压（positive end expiratory pressure，PEEP）>14 cmH_2O（1 cmH_2O=0.098 kPa）、不能耐受分钟通气量减少或检查前依赖高浓度氧疗；（2）颅内高压；（3）气管插管的内径与支气管镜外径差值 < 2 mm[266-268,271,279-285]（推荐等级 D）。

5. 对于肺叶切除术后的机械通气患者，强烈不推荐常规进行支气管镜检查术及支气管肺泡灌洗术来预防肺不张[286-290]（推荐等级 A）。

6. 疑诊呼吸机相关性肺炎的患者，强烈建议优先使用非侵入性检查手段以获得病原学证据，仅上述方法无效时，才考虑行支气管镜检查术[291-306]（推荐等级 A）。

7. 经可弯曲支气管镜引导下气管插管，可在镜下观察并引导气管插管至恰当位置，同时观察有无气管损伤、出血、感染以及分泌物的情况。对于有颈椎损伤的患者，可弯曲支气管镜引导插管可在颈椎自然位置下进行，避免头颈部伸屈活动。对于颈椎有不稳定骨折、脱位的患者，可避免因气管插管

导致颈椎进一步损伤[307-309](推荐等级D)。

8. 呼吸机辅助通气患者进行TBLB操作时容易出现气胸、出血、一过性血压下降等并发症,故TBLB操作前应充分评估临床获益及风险。但其总体并发症发生率和操作相关的病死率并未显著升高[310-312](推荐等级D)。

五、术后处理

1. 局部麻醉结束2 h后或全身麻醉结束6 h后方可进食、饮水,以避免因咽喉仍处于麻醉状态而导致误吸[72-74,76](推荐等级D)。

2. 应通过口头或书面形式告知已行TBLB的患者,离院后仍可能发生气胸,如出现憋气、胸疼等症状时应及时就诊[161-163](推荐等级D)。

3. 对使用镇静剂的患者,应口头或书面告知其在24 h内不要驾车、签署法律文件或操作机械设备[313-314](推荐等级D)。

4. 使用镇静剂的门诊患者,应有人陪伴回家,避免自行驾车。对于老年人或行TBLB的高危患者,当日应有人在家中陪同[77,315](推荐等级D)。

5. 支气管镜检查术后,若为局部麻醉下操作推荐至少观察30 min;若为全身麻醉,推荐至少观察6 h,并判断患者生命体征平稳,无意识异常、呼吸困难、胸痛及咯血等情况,方可离院[316-317](推荐等级D)。

六、支气管镜的清洗、消毒及医务人员的防护

支气管镜的清洗、消毒以及医务人员的防护应参照中华人民共和国国家卫生健康委员会最新发布的“软式内镜清洗消毒技术规范”[318],综合近年来相关指南及规范[77,319-327],提出如下建议。

(一)支气管镜的清洗和消毒

1. 检查开始前、所有检查完成后及2名受检者检查之间,均应对支气管镜进行清洗和消毒(推荐等级D)。

2. 支气管镜的清洗和消毒应由经过培训的专业人员在内镜洗消间内进行(推荐等级D)。

3. 应每日监测使用中的消毒剂的有效浓度,并保存记录,低于有效浓度时应立即更换(推荐等级D)。

4. 清洁过程的第一步亦最重要的一步:应用医用清洗剂彻底清洗支气管镜(推荐等级B)。

5. 每次使用后应更换清洗剂,清洁毛刷宜使用一次性产品,重复使用的毛刷在使用后应进行灭菌或高度消毒水平的清洁处理(推荐等级C)。

6. 戊二醛对分枝杆菌杀灭作用起效较慢,过氧乙酸、二氧化氯和过氧化氢则起效较快(≤5 min),且较戊二醛的刺激性小,但较容易损伤支气管镜和清洗器具,稳定性较差,且价格较贵(推荐等级C)。

7. 采用2%戊二醛进行手工或自动消毒时,支气管镜的浸泡时间不得少于20 min(推荐等级C)。

8. 确诊或疑诊分枝杆菌感染患者使用过的内镜及其附件,其消毒时间应遵循消毒产品的使用说明。确诊或疑似人类免疫缺陷病毒(human immunodeficiency virus,HIV)感染患者使用过的内镜及附件,目前暂无特殊消毒规定。

9. 分枝杆菌(如龟分枝杆菌)抵抗力强,建议使用含氯消毒剂或过氧乙酸消毒剂(推荐等级B)。

10. 对乙型肝炎、HIV阳性以及怀疑结核病的患者,应安排在最后进行检查(推荐等级D)。

11. 为最大限度减少工作人员与消毒剂及消毒剂挥发气体的接触,推荐使用自动清洗消毒机对支气管镜进行清洗和消毒(推荐等级C)。

12. 自动清洗消毒机必须设有消毒槽、浸洗盘和各种液体通道,并常规对自动洗镜机及其配件进行检测和消毒(推荐等级C)。

13. 推荐使用灭菌水或过滤水对消毒后的内镜进行最终漂洗(推荐等级D)。

14. 若冲洗用水的质量难以保证时,应采用75%~95%的乙醇擦洗支气管镜的外表面,并冲洗管腔,这样可以杀灭包括分枝杆菌在内的非芽孢菌,且乙醇挥发后管腔会迅速干燥。在每次检查完毕及支气管镜存放前,推荐使用这种方法(推荐等级C)。

15. 对于热稳定的部件或配件(如活检钳)需用机械清洗装置(如超声清洗机)进行清洗,然后进行高压灭菌或其他灭菌处理(推荐等级D)。

16. 所有冲洗用水通道(水槽、过滤器及管道)的设计都应方便常规清洗和消毒(推荐等级D)。

17. 支气管镜室应建立内镜清洗消毒登记制度,登记内容应包括患者姓名、使用内镜及其他重复使用的器械编号、清洗时间、消毒时间以及操作人员姓名等事项,宜开展清洗消毒的信息化管理,做到可追溯(推荐等级D)。

18. 储存支气管镜前需在专门的地点进行干燥,最好装备空气干燥设备。(推荐等级D)。

19. 支气管镜必须悬挂储存,并保持环境干燥(推荐等级D)。

20. 建立工作人员培训制度,当引进新型号的支气管镜或处理设备时,一定要准备相应的技术说

明书，并进行培训（推荐等级 D）。

（二）医务人员的防护

1. 当怀疑有污染时，培养范围必须包括支气管镜及其器械、自来水及清洗、消毒处理设备（推荐等级 C）。

2. 当怀疑有感染发生时，应向医院感染管理部门、支气管镜生产商、疾病预防和控制中心及卫生行政部门通报情况（推荐等级 C）。

3. 所有医务人员应接种乙型肝炎疫苗，在适当的时候检测机体的免疫状态（推荐等级 D）。

4. 在行支气管镜检查术过程中，医务人员应穿戴防护用具，包括隔离衣或防水围裙、口罩、护目镜和手套（推荐等级 C）。

5. 对确诊或疑诊多重耐药结核分枝杆菌感染的患者进行支气管镜检查术时，医务人员推荐佩戴医用防护口罩（推荐等级 D）。

6. 医务人员所使用的手套应不含滑石粉（推荐等级 B）。

7. 针状活检钳等锐利附件的清洗应格外小心，以防止医务人员刺伤（推荐等级 C）。

8. 工作中可能与醛类物质接触的所有医务人员均应在参加工作前进行体检；参加工作后，职业保健部门应定期检查其肺功能，了解其有无不适主诉（推荐等级 D）。

9. 为了尽可能避免医务人员与消毒剂接触，支气管镜最好在装有自动通风系统的专用房间内消毒，有条件者在烟尘柜中进行更好（推荐等级 D）。

10. 在清洗和消毒器械过程中，医务人员应穿戴防护用具，包括丁腈橡胶手套、能保护双眼的护目镜或防护面屏、口罩以及塑料隔离衣，以免受到溅出的污水、雾化液和蒸汽的侵害（推荐等级 D）。

11. 使用一次性附件（尤其是注射针）可以减少医务人员在清洁器械过程中被感染的风险（推荐等级 C）。

12. 为了避免医务人员与消毒剂接触，应尽可能使用高压蒸汽灭菌器械或一次性器械（推荐等级 C）。

13. 从事支气管镜操作的专业人员，应接受有关患者护理、感染控制、器械清洁（包括醛类物质的安全使用及在器械清洁过程中可能危害健康的因素）等知识的培训（推荐等级 D）。

14. 经常使用透视或 CT 辅助进行支气管镜检查术操作的人员要求于其左侧胸上部常年佩带放射剂量检测仪，保持清洁，防止污染，时间不超过 90 d（推荐等级 D）。

15. 对职业照射人员个人规定的剂量限值：（1）成年人连续 5 年的年平均有效剂量为 20 mSv，但不可做任何追溯性年平均；连续 5 年中的任何单一年份的年有效剂量为 50 mSv，但连续 5 年平均有效剂量不得超过 20 mSv ；眼部晶状体的年当量剂量为 150 mSv；四肢或皮肤的年当量剂量为 500 mSv。（2）确认怀孕后，职业照射人员将执行与公众相同剂量限值。（3）在特殊情况下，可以对个人年剂量限值做下述临时改变：按审管部门规定，连续 5 年的平均期可破例延长至 10 个连续年；10 年内任何一位职业照射人员个人的年平均有效剂量不得超过 20 mSv；在 10 个连续年期间任何单一年份受到的年有效剂量不得超过 50 mSv；在 10 个连续年期间，自延长期以来任何一位职业照射人员受到的有效剂量累计达到 100 mSv 时，应对此进行审查。对个人剂量限值的临时变更应遵守审管部门的规定，任何一年内不得超过 50 mSv；临时的改变期限不得超过 5 年（推荐等级 D）。

16. 操作环境需要符合国家放射防护标准的要求，有安全设置、电离辐射警告标志、照射状态指示灯、“门-机”连锁装置和防辐射措施（推荐等级 D）。

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本刊“介入园地”栏目征稿

近年来，随着介入呼吸病学的迅速发展，国内外针对呼吸内镜技术的相关研究不断拓展和深入，已成为呼吸病学中一个朝气蓬勃、前景广阔的新领域。借助荧光支气管镜、超声引导下的经支气管淋巴结活检、电烧灼、冷冻、气道内支架置入、球囊扩张和光动力治疗等呼吸内镜相关新兴技术，呼吸系统疾病的诊断和治疗手段有了长足进步，但目前我国介入呼吸病学的发展水平与发达国家相比还有一定差距，介入技术的普及程度仍然不足，更重要的是介入技术的应用尚缺乏规范。

为宣传、普及、探讨和逐步规范介入呼吸病学技术的应用，提供一个供相关专业人员交流、争鸣以及相互学习的平台，本刊自2010年起开辟“介入园地”栏目，来稿形式不拘，以临床报道为主，无论是学科最新进展，还是疑难和（或）经典病例介绍，或是临床经验总结及临床实践中所遇到的问题，均欢迎踊跃赐稿。

来稿需通过中华医学会远程稿件处理系统（www.cma.org.cn）上传，作者投稿操作说明可通过中华医学会网站业务中心下载。

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