

改良退针芯法在 BARD 活检针经皮活检肩胛骨区肺小结节的应用

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摘要:【目的】探讨应用 BARD 活检针改良退针芯法经皮活检肩胛骨区肺小结节(直径 ≤ 20 mm)的临床价值。【方法】回顾性分析 2011 年 1 月至 2015 年 5 月共 83 例肩胛骨区肺内单发小结节(直径 ≤ 20 mm)患者,按时间分为传统组 31 例(2012-05 之前),采用传统退针法获取标本,改良组 52 例(2012 年 5 月-2015 年 5 月),采用改良退针芯法获取标本,所有病例均在 CT 引导下利用体表标记定位法进行定位,穿刺均由固定医师操作,应用 18G BARD 活检针取得 2 条以上组织标本送病检行 HE 染色、免疫组化检查,部分病例行基因检测,分别统计两组病人手术时间、穿刺成功率、诊断阳性率和并发症发生率。【结果】83 例肩胛骨区肺小结节穿刺活检结果:传统组手术时间(63.6 ± 7.6)min,穿刺成功率 90.3%(28/31),诊断阳性率 87.1%(27/31),并发症率 22.6%(7/31);改良组手术时间(30.7 ± 4.5)min,穿刺成功率 98.1%(51/52),诊断阳性率 96.2%(50/52),并发症率 3.8%(2/52)。两组间手术时间和并发症率差异有统计学意义($P < 0.05$)。【结论】利用 BARD 活检针改良退针芯法经皮活检肩胛骨区肺小结节(直径 ≤ 20 mm)可以精确的获取组织标本,与传统方法相比节省手术时间,并发症减少,值得临床进一步推广应用。

关键词:活检;肩胛骨;肺小结节

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Application of BARD Gun with Improved Recede Needle Method in Percutaneous Transthoracic Biopsy of Pulmonary Nodules under the Shoulder Blade Area

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Abstract: 【Objective】 To investigate the value of BARD gun with improved needle method in percutaneous transthoracic biopsy of pulmonary nodules ($d \leq 20$ mm) under the shoulder blade area. 【Methods】 83 patients with solitary pulmonary nodules ($d \leq 20$ mm) from January 2011 to May 2015 in Guangdong No.2 provincial People's Hospital wererecruited. The BARD gun with traditional recede needle method was implemented in 31 patients in traditional group, BARD gun with improved recede needle method was performed in 52 patients in improved group. With 18 G BARD biopsy gun, 2 or more tissue specimens were acquired for HE staining and immunohistochemical examination, some for further genetic testing. The statistics of two groups, including operation time, the success rate, the rate of positive diagnosis and complications, were recorded and analyzed. 【Result】 In the control group, the average operational duration was (63.6 ± 7.6)min, the success rate of puncture 90.3%(28/31), the positive diagnostic rate was 87.1%(27/31), the incidences of complications was 22.6%(7/31), in the experiment group, the average operational duration was (30.7 ± 4.5) min, the success rate of puncture was 98.1%(51/52). The positive diagnostic rate was 96.2%(50/52). The incidences of complications was 3.8%(2/52). The differences in duration and rates had statistical significance ($P < 0.05$). 【Conclusion】 BARD gun with improved needle method have accuracy, less operational duration and less complications in percutaneous transthoracic biopsy of pulmonary nodules under the shoulder blade area, and it deserves to be further spread in the clinic.

Key words: biopsy; scapula; pulmonary nodules

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CT引导下经皮肺穿刺活检术具有定位准确、成功率高的特点,临床应用价值较广,但对于特殊部位的肺小结节穿刺难度明显增加^[1-3],肩胛骨区肺小结节是指投影在双侧肩胛骨区域前方的肺组织内的直径 ≤ 20 mm小结节,该部位的肺小结节穿刺路径复杂,穿刺成功率低,并且容易出现并发症;我科自2011年1月-2015年5月共收集肩胛骨区肺小结节病人83例,其中改良组52例病人采用18G BARD活检针改良退针芯法经皮活检,取得较满意的结果,现报道如下。

1 材料与方 法

1.1 临床资料

选取我院2011年1月至2015年5月共83例肩胛骨区肺内单发小结节(直径 ≤ 20 mm)患者,其中男性43例,女性40例;年龄24~78岁,病灶直径约11~20 mm,所有肺内孤立性结节均位于肩胛骨投射区域,按时间分为传统组31例(2011-01至2012-05)、改良组52例(2012-05至2015-05),传统组采用传统法退出针芯和针套的获取标本,改良组采用改良法只退针芯保留针套的方法获取标本,两组患者一般临床资料见表1。

表 1 传统组和改良组患者一般临床资料情况比较

Group	n	Age/years	Diameter/mm
Traditional group	31	53.6 \pm 13.2	15.8 \pm 3.0
Improved group	52	54.1 \pm 11.6	15.3 \pm 2.7
P		0.629	0.766

There were no significant between-group differences in age and diameter.

1.2 病例纳入标准

(1)孤立性肺结节位于患者肩胛骨区,结节直径 ≤ 20 mm;(2)高度怀疑肿瘤要求明确病理和细胞学诊断,经过内科治疗和定期复查结节增大;(3)患者拒绝行外科手术或存在外科手术禁忌证;(4)术前CT图像显示有可选择的进针路径;(5)患者可以配合屏气并且无严重心肺功能不全及凝血功能障碍;所有被试签署知情同意书。

1.3 仪器和设备

荷兰飞利浦公司生产的Brilliance 16排螺旋

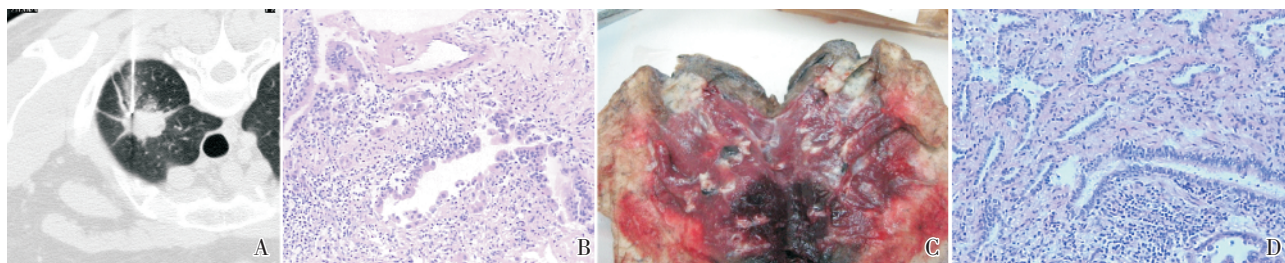
CT机,美国BARD公司生产的分体式半自动活检枪,一次性使用活检针(Magnum),型号:MN1816,南京泰来医疗器械有限公司生产的医用定位纸。

1.4 穿刺活检方法

所有病例术前三大常规、凝血象、心电图均无明显异常,肝炎、梅毒、HIV检测阳性者术中注意防止针刺伤,穿刺前常规心电监护,留置静脉通道,嘱病人做屏气训练,根据病变部位选择合适的体位,先将定位标记固定于患者病变对应的体表处。本实验中所有被试术前均进行常规行胸部CT平扫及增强扫描,以观察病灶位置及其血供情况。穿刺术中再次应用CT扫描定位病灶,术前CT增强扫描结果显示病灶血供丰富、或与大血管位置分界不清者,术中还需进行CT增强扫描以避免血管损伤。扫描条件:层厚5 mm,螺距1.375:1,进床速度18.75 mm/rot,电压120 kV,电流150 mA。确定病灶的横坐标及纵坐标交界点为穿刺进针点并在体表标记,多平面重建选择最佳穿刺路径,测量穿刺角度及进针深度,皮肤常规消毒、铺无菌巾单,用2%利多卡因局部麻醉穿刺点皮肤至胸膜,再将针头退至皮下,行CT扫描再次确认进针路径后换成活检针并按预定路径进针,由肋骨上缘进针,避开肩胛骨、血管及段支气管,嘱患者屏气后迅速进针,当病灶距离胸壁较远且周围有大血管时,需采用逐步进针法,不提倡穿刺针一步到位,行CT扫描确定穿刺针尖端位于病灶内(图1-4),连接活检枪发射器,调节针槽长度,打开保险,再次嘱患者屏气然后发射活检针取出标本,传统方法组采用将穿刺套针整体退出体外然后拉开针槽获取标本组织,发现组织标本不满意时再次重复经皮穿刺病灶,直至取出较为满意的标本;改良方法组则将针套留在病灶内,卸下活检枪,缓慢退出针芯直至看到针槽,直接在针槽处获取标本,若标本不满意,可再次将针芯推送进针套,重新获取标本。术中需严密观察患者有无胸闷、气促、呼吸困难、咯血等症状,术后常规复查胸部CT扫描,选择肺窗和纵膈窗观察有无气胸、病灶周围及穿刺针道有无肺出血、胸腔积液等征象,出现并发症时需延长观察时间并决定是否行胸腔闭式引流治疗气胸及介入栓塞止血治疗大咯血。

1.5 病理检查方法

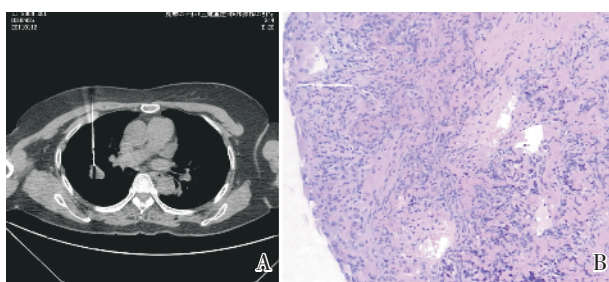
标本用甲醛固定,HE染色,免疫组化检查,基因检测。



A female in improved group, 50 years old, who has a nodular opacity located in the right upper lobe, the nodule was 1.5 cm in diameter. A: Biopsy was performed with biopsy needle guided and located accurately by CT. B: moderately differentiated lung adenocarcinoma. C: surgical specimen. D: The results of postoperative pathology: moderately differentiated lung adenocarcinoma (right upper lobe), direct invasion of the pleura. $\times 400$

图 1 改良组 1 例右上肺结节患者的 CT 定位穿刺影像及病理切片图

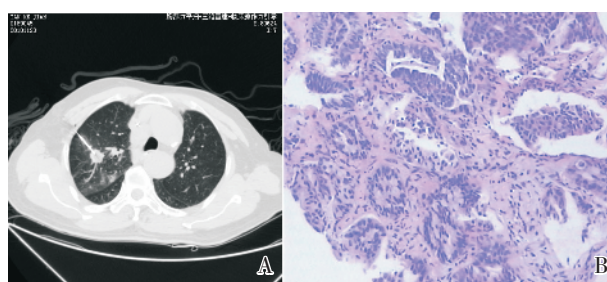
Fig.1 The CT image for the guiding and locating of biopsy and lung adenocarcinoma of patient with nodular in right upper lobe in improved group



A female in improved group (69 years old), who has a nodular opacity located in the right upper lobe, the nodule was 1.7 cm in diameter. A: Biopsy was performed with biopsy needle guided and located accurately by CT. B: lung adenocarcinoma (right upper lobe), grade II-III, $\times 400$.

图 2 改良组 1 例右肺结节患者的 CT 定位穿刺影像及病理切片图

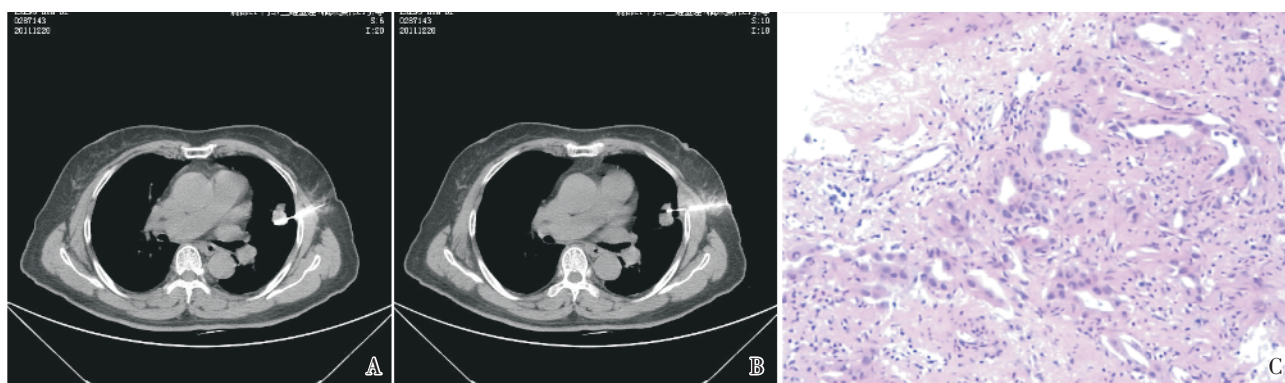
Fig.2 The CT image for the guiding and locating of biopsy and lung adenocarcinoma of patient with nodular in right lobe in improved group



A female (66 years old) in improved group, who has a nodular opacity located in the right upper lobe, the nodule is 1.5 cm in diameter. A: Biopsy was performed with biopsy needle guided and located accurately by CT. B: lung adenocarcinoma (right upper lobe), grade I-II. $\times 400$

图 3 改良组 1 例右上肺结节患者的 CT 定位穿刺影像及病理切片图

Fig.3 The CT image for the guiding and locating of biopsy and lung adenocarcinoma of patient with nodular in right upper lobe in improved group



A female (66 years old) in traditional group, who has a nodular opacity located in the left upper lobe, the nodule is 2.0 cm in diameter. A, B: Biopsy was performed with biopsy needle guided and located accurately by CT. C: lung adenocarcinoma (left upper lobe), grade I-II. $\times 400$

图 4 传统组 1 例左肺结节患者的 CT 定位穿刺影像及病理切片图

Fig.4 The CT image for guiding and locating of biopsy and lung adenocarcinoma of patient with nodular in left lobe in traditional group

1.6 观察指标

记录传统组及对照组患者年龄、病灶直径大小、穿刺操作时间、穿刺成功病例数、明确诊断病例数、出现并发症病例数,统计两组患者穿刺成功率、诊断阳性率和并发症发生率。

1.7 统计学方法

应用 SPSS 18.0 统计软件,对符合正态分布的计量资料以($\bar{x} \pm s$)表示,采用独立样本 t 检验对两组数据进行分析,了解两组数据有无差异;两组患者穿刺成功率、诊断阳性率和并发症发生率的比较采用 χ^2 检验, $P < 0.05$ 认为差异有统计学意义。

2 结果

2.1 患者一般临床资料情况

传统组和改良组所有被试的年龄和肺内结节直径差异无明显统计学意义($P > 0.05$;表 1)。

2.2 两组病例穿刺活检结果和统计分析

传统组手术时间(63.6 ± 7.6)min,穿刺成功率 90.3%(28/31),诊断阳性率 87.1%(27/31),其中肺腺癌 24 例,肺鳞状细胞癌 2 例,真菌感染 1 例。本组并发症率 22.6%(7/31),4 例发生少量气胸,出现肺内出血 2 例,1 例中量气胸,行胸腔负压引流后气胸消失,无大量气胸并发症,气胸发生率 16%(5/31),2 例病人术后即刻 CT 复查提示肺内穿刺针道出血,患者出现一过性咯血,咯血发生率 6.5%(2/31),无死亡病例。

改良组手术时间(30.7 ± 4.5)min,穿刺成功率 98.1%(51/52),诊断阳性率 96.2%(50/52),其中肺腺癌 43 例,肺小细胞癌 5 例,肺鳞状细胞癌 4 例。并发症率 3.8%(2/52),本组 2 例发生少量气胸,无中量及大量气胸发生,气胸发生率 3.8%(2/52),1 例出现肺内出血,病人无咯血,无死亡病例。

采用独立样本 t 检验对两组被试的手术时间进行数据分析,了解两组数据差异有无统计学意义,结果, $t = 12.381$, $P = 0.001$,可以认为两组被试的手术时间是有统计意义的,改良组的手术时间明显少于传统组。

使用非参数检验的两个独立样本检验,分别对两组被试的穿刺成功率、诊断阳性率和并发症率进行分析,得到的 P 值分别为 0.113、0.126、0.000。可以认为两组被试的穿刺成功率和诊断阳

性率没有统计意义,而并发症率有显著差异,改良组的并发症率明显低于传统组(表 2)。

表 2 传统组和改良组患者穿刺时间、穿刺成功率、诊断阳性率、并发症率比较

Table 2 The difference between traditional group and improved group in the rate of success puncture, positive diagnostic, complications and the duration

Group	Duration/min	Success rate of puncture	The positive diagnostic rate	The rate of complications
Traditional	63.55 ± 7.57	90.3%(28/31)	87.1%(27/31)	22.6%(7/31)
Improved	30.73 ± 4.47	98.1%(51/52)	96.2%(50/52)	3.8%(2/52)
P	0.001	0.013	0.126	0.000

The improved group showed less duration and lower rate of complications, but the positive diagnostic rate and success rate of puncture have no significant between-group differences.

3 讨论

3.1 肺内孤立性小结节的早期定性诊断

随着居民健康体检意识的普及和影像学技术的发展,临床上诊断为肺内孤立性结节^[4-5]的病例数逐渐增加,因此,尽早明确病灶的病理性对疾病的诊疗和预后有着非常重要的意义^[6]。尽管目前检查手段较多,技术不断更新,但仍存在一定的误诊率,导致一些良性病变的病人不得不接受外科手术^[7-8]。多层螺旋 CT 及其强大的分析软件可以提高临床诊断水平^[9-12],但缺乏病理学依据;纤维支气管镜适合于中央型肺结节病灶,而肺内孤立性小结节多数位于肺外周,支气管镜往往难于发现病灶,诊断困难;胸腔镜探查适于位于肺边缘的肺小结节或局部胸膜有改变者^[13-16],对于深部结节同样难于定位;利用 CT 扫描良好的空间分辨率和密度分辨力可以引导精确的穿刺定位,文献报道,CT 引导肺部病灶穿刺活检诊断准确率高达 99%,对恶性肿瘤诊断的敏感性高,特异性强;因此 CT 引导经皮穿刺肺活检术依然是临床上最重要的诊断手段。

3.2 如何提高穿刺的准确性和降低并发症

CT 定位下肺穿刺活检的主要并发症有:气胸、肺内出血、咯血、血气胸、气体栓塞、腹腔积液等^[17-18]。本文统计传统组气胸发生率 16%,改良组气胸发生率 3.8%,无大量气胸,无血气胸、无气体栓塞病例。笔者认为,肺穿刺活检并发症可能与以

下因素密切相关:①病灶距离胸壁的距离越远,穿刺次数越多,越容易出现并发症;②操作者的穿刺技术越熟练,并发症发生率越低;③与患者配合程度相关,患者越紧张,呼吸移动度大者容易出现并发症^[19-20]。

术前根据 CT 检查制定合适的穿刺路径,了解病灶的部位、大小、形态以及病灶与周围结构的毗邻关系,尽可能选择最短距离垂直方向进针的方法,理论上 CT 引导下活检针可准确到达肺部任何部位的病灶,肩胛骨区肺内小结节周围解剖结构复杂,其后外侧有肩胛骨、肋骨阻挡,前上方有锁骨及锁骨下动静脉,内侧有纵膈、大血管毗邻,穿刺时进针路径常常受限,但通过 CT 引导多方向定位可以有效避开骨性组织及重要脏器,顺利到达病变部位。

患者术前行屏气训练,嘱患者平静缓慢呼吸,医生告知需要屏气时患者立即执行屏气动作,禁止吸气后屏气,要求患者做到每次屏气后的 CT 扫描定位相与穿刺针经皮进入瘤体过程及穿刺到位后取得活检的瞬间均保持平静呼吸-屏气动作的高度一致性,尽可能使每次屏气时相病灶位置相对固定,提高穿刺准确性,减少穿刺次数及并发症的发生。另外,对于情绪相对紧张的患者,术前应尽可能的消除患者的疑虑并取得其信任与配合,必要时,术前给予苯巴比妥钠针镇静处理。

3.3 比较传统组和改良组两组方法的优缺点

肺部小结节尤其是肩胛骨区的肺小结节由于肋骨、肩胛骨阻挡进针路径,同时还要考虑避免损伤肋间动脉、胸壁血管、纵膈血管,设计穿刺路径往往舍近求远;由于患者呼吸运动的影响,在穿刺过程中仍需反复多次调整穿刺针的角度及进针深度,穿刺难度非常大、容易出现并发症;并且由于病灶太小,一次取材的标本往往不满意,需要重复多次穿刺取材,增加了病人气胸、咯血等风险。早期的 31 例患者完成一次穿刺后将穿刺针整体退出体外再刮取组织标本,发现标本不满意时需 CT 引导再次经皮穿刺瘤灶,不但增加了手术穿刺时间,而且增加了患者出现气胸、肺出血甚至咯血的风险,患者出现气胸、肺出血发生率为并发症率 22.6%(7/31);笔者经过分析穿刺针的结构及机械原理发现 BARD 穿刺针由前端带针槽的针芯和针套组成,活检枪手柄触发开关时先由针芯向前方发射,紧接着针套向前端发射并与针尖重合,标本

留置在针槽内,因此,改良组 52 例患者完成一次穿刺后将针套留在病灶内,单纯退出针芯从而在针槽内取得标本,由于针套保留在病灶内,第二次穿刺只需将针芯送入针套再根据 CT 扫描重新调整针尖位置然后再次取得标本即可。两组比较发现,改良组大大简化了反复经皮穿刺瘤灶的过程,缩短了手术时间,提高了穿刺成功率及诊断准确率,同时穿刺并发症明显下降。但是,由于退针芯时由于针套管的摩擦可能导致标本量的减少,穿刺前利用生理盐水冲洗套管或许可以减少样本的丢失,仍需要进一步研究证实。另外,病灶内留置套管针时外端需保持密闭状态,防止由于胸腔负压或者静脉回流导致气体栓塞的严重后果。

综上所述,简化穿刺流程、提高穿刺准确率及降低并发症是经皮肺活检术的三大要素。术前制定详细的穿刺方案,利用 CT 扫描的精准定位,熟练的操作技术及术中患者的配合及监测等等,每一个环节都是保证手术成功的关键,利用 BARD 穿刺针的结构特点进行改良操作,可以有效提高手术成功率并降低手术风险,是肩胛骨区孤立性肺结节穿刺活检的首选之一,值得临床进一步推广和应用。

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