

## 超声引导下闭孔神经阻滞的临床应用进展

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闭孔神经阻滞在临床上用于处理经尿道膀胱肿瘤电切除术(transurethral resection of bladder tumor, TURBT)中的大腿抽动及髋部和膝部镇痛等问题。闭孔神经扁平纤细,没有蜂窝样图像,个体差异很大,不易辨识<sup>[1]</sup>,阻滞难度大。闭孔神经阻滞经历了传统体表标志定位法、神经刺激器引导法、和超声引导下闭孔神经阻滞法多个阶段。超声引导下可见闭孔神经及其周围组织和血管,相比传统的体表标志定位与神经刺激器引导法,超声引导下阻滞法可减少进针次数,缩短操作时间<sup>[2]</sup>和起效时间<sup>[3]</sup>,减少意外血管穿刺的次数<sup>[4,5]</sup>。目前超声引导下闭孔神经阻滞方法主要有远端阻滞法和近端阻滞法。本文将结合闭孔神经的解剖特点和临床麻醉与镇痛需求,总结归纳各种闭孔神经阻滞方法的利弊,以期待为今后的临床麻醉工作提供参考。

### 远端阻滞

远端阻滞是指在超声引导下分别在闭孔神经前支和后支所在的筋膜内注入局麻药。患者仰卧位,大腿轻度外展外旋,超声探头放在腹股沟皱褶处,与皮肤垂直。可观察到耻骨肌、长收肌、短收肌和大收肌。平面内超声引导下于耻骨肌与短收肌或长收肌与短收肌之间<sup>[6-8]</sup>的筋膜注入局麻药阻滞前支。于短收肌和大收肌之间的筋膜注入局麻药阻滞后支<sup>[5,6]</sup>。

超声引导下远端闭孔神经阻滞法,增强了操作可视性,并获得一定认可<sup>[9-11]</sup>,但也有一定局限性。首先,闭孔神经扁平纤细,超声下不易观察。据研究统计,部分患者的闭孔神经前后支在超声下并不可见,且易与亚分支混淆,还需神经刺激器辅助引导<sup>[12]</sup>。其次,8%~29%的人存在副闭孔神经。副闭孔神经源于总闭孔神经,在闭孔神经的近端水平分叉,距前支和后支在远端的解剖位置较远<sup>[13]</sup>。副闭孔神经通常参与髋关节分布<sup>[14]</sup>,TURBT术中副闭孔神经也会因膀胱充盈而距离膀胱较近。因此,在这些应用领域,远端阻滞难以阻滞副闭孔神经等近端闭孔神经分支,可能引起阻滞不全。

### 近端阻滞

近来更多的学者进行超声引导下近端闭孔神经阻滞的研究。近端阻滞是以耻骨肌和闭孔外肌之间的筋膜为靶位,

通过单次注射局麻药完成闭孔神经阻滞<sup>[15-17]</sup>,阻滞成功率可达100%<sup>[15,18-19]</sup>。其较远端阻滞法成功率明显增高,一是因为定位标志明确,超声引导下可清晰的观察到耻骨肌和闭孔外肌之间的筋膜层;二是因为阻滞范围广泛,总闭孔神经或刚刚分开的前支和后支均走行于耻骨肌和闭孔外肌之间的筋膜层<sup>[1]</sup>,据近来的尸体研究发现,在此处注入染料可通过闭孔管逆行扩散至盆腔,沾染所有的闭孔神经分支<sup>[17]</sup>,其中包括副闭孔神经和闭孔神经髋关节支<sup>[12]</sup>。

目前的近端阻滞法有很多种,不同学者采取不同的进针方式(平面内或平面外),探头位置和患者体位,但阻滞靶位均为耻骨肌与闭孔外肌之间的筋膜,各有其利弊。

Anagnostopoulou等<sup>[1]</sup>、Taha<sup>[15]</sup>和Lin等<sup>[14]</sup>均取患者仰卧位,髋轻度外旋。先将探头与皮肤垂直置于腹股沟皱褶处,再将探头向颅侧旋转40°~50°,直至看到耻骨肌与闭孔外肌之间较深的高回声平面,通过单次注入局麻药完成阻滞。Anagnostopoulou等和Taha采取了平面外进针,而Lin等采取了平面内进针。平面内进针法的优点是能在超声下实时观察针的进程,可减少血管和神经的意外损伤;缺点是当探头旋转到较大角度,很难将针的插入点与探头位置维持在一条队列,即很难在超声图上同时看到针和靶位<sup>[17]</sup>。

操作上应注意,患者仰卧位时,将大腿外旋,膝屈曲时很难观察到闭孔神经,而应将大腿放直,并轻度外旋<sup>[7]</sup>。平面内进针时,进针角度越大,图像越清晰<sup>[20-21]</sup>;平面外进针角度越小越陡,针尖显像越清晰<sup>[21-22]</sup>,将针尖的斜面正对或背对超声波也利于观察针尖<sup>[23]</sup>。

Akkaya等<sup>[18]</sup>取患者仰卧位,将探头置于股静脉与耻骨小结之间的耻区,取矢状位,平面内进针。观察到耻骨上支,耻骨肌和闭孔外肌,平面内进针,由内向上直至耻骨肌与闭孔外肌之间的平面。在此处进针的优点是利于实时观察针的位置。缺点一是此处靶位较深,需要以很陡的角度进针,针的可视性下降。此时可按压探头尾部,通过改变探头的角度来增加针的角度,以使图像更加清晰<sup>[19,24]</sup>。二是以此种途径进针,探头正位于闭孔动脉和静脉从盆腔穿出闭孔管的侧方,容易损伤血管。研究中有1例患者意外损伤了闭孔静脉,很可能是因为闭孔静脉刚好位于操作区下方,而探头的长轴与血管平行,稍有调整不适即可导致超声窗内观察不到闭孔静脉,因而意外穿刺到闭孔静脉。

Yoshida等<sup>[17]</sup>取患者截石位,将探头放在沿腹股沟皱褶延长线的大腿内侧、会阴侧方,从探头的前方向头侧进针,其从近端大腿的内侧观察耻骨肌与闭孔外肌之间的平面。先辨识出耻骨上支,再辨识出其上表的闭孔外肌,之后在耻骨

上支和闭孔外肌的前方辨识出耻骨肌。闭孔神经就走行于耻骨肌与闭孔外肌之间的高回声筋膜内。这种方法有两大优点:一是针插入较浅的 4~10 cm 即达耻骨肌与闭孔外肌之间的筋膜;二是进针方向几乎与超声波垂直,能清楚的观察针尖。理论上,这种方法的清晰度明显高于其它方法。但这种体位仅适用于 TURBT 术的患者,不适用于不方便取截石位的患者。

尽管近端阻滞方法不需联合使用神经刺激器,但有时很难从高回声的筋膜中辨识出闭孔神经,应注意阻滞时的注射压力,以避免神经束内注射局麻药,造成神经损伤<sup>[24-26]</sup>。

### 小 结

综上所述,闭孔神经扁平纤细,个体差异大,不容易阻滞成功。超声引导增强可视性,提高阻滞成功率,减少血管意外穿刺等并发症。理论上选择近端阻滞更完全、成功率更高,但这些方法的利弊还需今后更多的临床研究进一步证实。

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(收稿日期:2018-04-21)