

PTCD 术中运用经胆管超声造影的临床价值

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[摘要] 目的: 研究经胆管超声造影(IB-CEUS)对经皮肝穿刺胆道引流术(PTCD)的指导意义。方法: 对 36 例拟行 PTCD 的患者术中经超声引导置管, 所有患者在置管前均行常规超声检查, 置管后先行常规超声检查, 后行 IB-CEUS 检查, 比较 IB-CEUS 检查前后患者胆管显示范围及引流管末端显示率。结果: 所有患者在超声引导下均成功置管, IB-CEUS 成功率为 100%。常规超声及 IB-CEUS 对肝内一级胆管的显示率均为 100%(72/72), 对二级胆管的显示率分别为 94%(135/144)、97%(140/144), 对三级胆管的显示率分别为 52%(151/288)、96%(276/288)。IB-CEUS 对引流管末端的显示率为 100%(41/41), 明显优于常规超声的显示率(22%(9/41))($P<0.001$)。结论: IB-CEUS 对肝内胆管及引流管末端的显示优于常规超声检查, 可实时评价 PTCD 的有效引流范围, 为疗效评价提供依据。

[关键词] 黄疸, 阻塞性; 穿刺抽液术; 超声检查, 介入性

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Clinical value of intra-biliary contrast-enhanced ultrasound in percutaneous transhepatic cholangial drainage

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Abstract: Objective: To investigate the guiding significance of intra-biliary contrast-enhanced ultrasound (IB-CEUS) in percutaneous transhepatic cholangial drainage (PTCD). **Methods:** Thirty-six patients who were to undergo PTCD were treated with ultrasound-guided catheterization. All patients underwent conventional ultrasound examination before catheterization, followed by another conventional ultrasound examination and IB-CEUS assessment after catheterization. Comparisons were made between the visualization range of the bile duct and the visualization rate of the drainage tube endpoint before and after IB-CEUS. **Results:** All patients were successfully catheterized under ultrasound guidance and the success rate of IB-CEUS was 100%. The visualization rates of primary bile duct by conventional ultrasound and IB-CEUS were both 100%(72/72), and the visualization rates of secondary bile duct were respectively 94%(135/144) and 97%(140/144). The percentage of 52%(151/288) and 96%(276/288) represented the visualization rates of tertiary bile duct by conventional ultrasound and IB-CEUS, severally. The visualization rate of IB-CEUS for catheter end was 100%(41/41), which was significantly better than that of conventional ultrasound (22%(9/41))($P<0.001$). **Conclusion:** The results of IB-CEUS on the intrahepatic biliary and the drainage tube endpoint are superior to those of conventional ultrasound examination, which can evaluate the effective drainage range of PTCD in real time and lay a solid foundation for assessing therapeutic effects.

Key words: Jaundice, Obstructive; Paracentesis; Ultrasonography, Interventional

超声因具有便携、无创、无辐射、实时的优势被广泛用于各种术中引导、监测、疗效评价中。在经皮肝穿刺胆道引流术 (Percutaneous transhepatic cholangial drainage, PTCD) 中, 常规超声对目标胆管的选择、穿刺定位的准确性已获广泛认可, 但对置管即刻预期引流效果缺乏评价方法。本研究于 PTCD 置管即刻, 运用经胆管超声造影 (Intra-biliary contrast-enhanced ultrasound, IB-CEUS) 观察置管末端的位置以及肝内各级胆管显示情况, 判断有效引流

范围, 为临床评价疗效提供依据。

1 资料与方法

1.1 研究对象

收集 2022 年 1 月—2024 年 1 月在海军第九〇五医院及武警上海总队医院治疗的梗阻性黄疸患者 36 例, 所有患者对所做检查均知情同意。其中男 21 例, 女 15 例, 年龄 36~81 岁, 平均(48.1±10.8)岁。患者中壶腹部梗阻 18 例, 第一肝门部梗阻 11 例, 肝外

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胆管梗阻 7 例。入组患者均排除凝血功能障碍、大量腹水、严重心肺功能不全等。

1.2 仪器与方法

使用 ACUSON Sequoia Silver 超声诊断仪, 5C1 探头, 频率范围 1~5 MHz。术前经常规超声检查确定目标胆管, 观察记录左右肝管(一级胆管)、肝内胆管左内外支、右前后支(二级胆管)及 8 支三级胆管显示情况。患者于局麻或全麻下行 PTCD, 记录引流管末端显示例数。固定引流管前, 配置超声造影剂 SonoVue 悬浊液 5 mL, 将悬浊液用生理盐水按 1:30 比例稀释, 抽取 30 mL 稀释液, 经引流管缓慢推注, 同时启用造影模式, 实时观察引流管末端位置及肝内各级胆管显示情况, 调整引流管至最佳位置后, 于体表固定。术后观察引流液、患者血胆红素等指标。

1.3 统计学方法

应用 SPSS 19.0 统计学软件分析数据。IB-CEUS 检查前后各级肝内胆管的显示率及引流管末端显示率比较用 χ^2 检验。 $P < 0.05$ 为差异有统计学意义。

2 结果

2.1 患者情况

36 例患者均置管成功, 于术中顺利行 IB-CEUS 检查, 其中 86% (31/36) 的患者行肝右叶入路, 14%

(5/36) 的患者因体位受限等原因, 行肝左叶入路。1 例患者术后引流出少量血性胆汁, 用止血药后好转。所有患者置管后血总胆红素、直接胆红素较术前明显降低, 肤色逐渐恢复正常, 黄疸治疗效果满意。

2.2 引流管末端显示情况

36 例患者共置入引流管 41 根, 常规超声检查仅显示 9 根引流管末端位置, 余 32 根引流管末端未显示, 显示率为 22% (9/41); IB-CEUS 显示引流管入路清晰(图 1), 并可清晰显示引流管末端位置(图 2), 所置 41 根引流管均位于胆管内, 引流管末端显示率为 100% (41/41), 明显优于常规超声检查的显示率 ($P < 0.001$)。

2.3 肝内胆管显示结果

常规超声及 IB-CEUS 对肝内一级胆管的显示率均为 100% (72/72), 对二级胆管的显示率分别为 94% (135/144)、97% (140/144), 对三级胆管的显示率分别为 52% (151/288)、96% (276/288), 结果表明 IB-CEUS 对肝内三级胆管的显示率高于常规超声检查 ($P < 0.001$) (图 3)。其中 7 例患者置管即刻 IB-CEUS 示肝内胆管树有较大面积充盈缺损, 其中 5 例增加 1 根置管, 余 2 例经旋转引流管角度、调整位置后, 再次行 IB-CEUS 检查示肝内胆管树显示范围明显扩大。

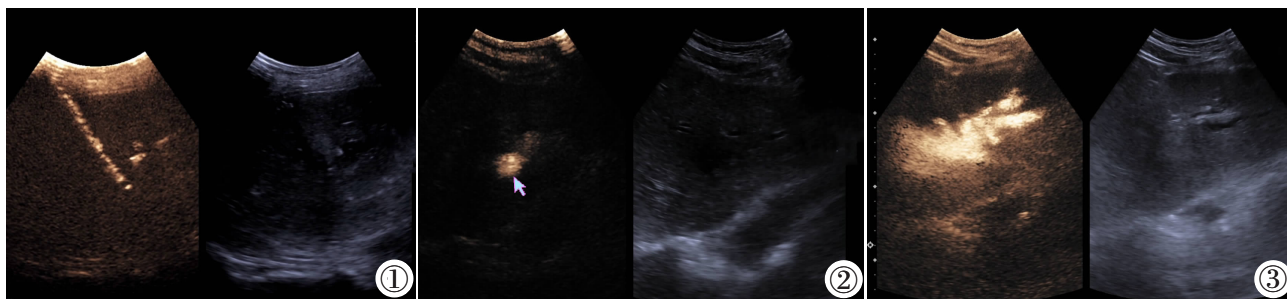


图 1 IB-CEUS 示引流管入路清晰。图 2 箭头所指为 IB-CEUS 显示引流管末端位置。图 3 IB-CEUS 清晰显示肝内胆管树。

Figure 1. IB-CEUS shows clear access to the drainage tube. Figure 2. The arrow points to IB-CEUS showing the location of the end of the drainage tube. Figure 3. IB-CEUS shows clear intrahepatic biliary tree.

3 讨论

PTCD 是临床解除梗阻性黄疸的常用方法^[1-2], 以往多用 X 线胆道造影评价疗效, 但其有辐射、使用场所受限且不能实时监测。IB-CEUS 具有无创、实时、可重复观察的优势, 可通过引流管注入超声造影剂, 显示肝内胆管树^[3-7], 超声造影剂 SonoVue 过敏发生率远低于碘过敏的发生率。本研究通过分析 36 例患者 PTCD 术中置管即刻、IB-CEUS 前后肝内各级胆管及引流管末端显示情况^[8], 判断置管有效引流范围, 为预测疗效提供依据。本研究所有患者治疗效果满意, 有 1 例患者术后引流袋中出现少量血性胆汁, 经止血治疗后好转, 可能是损伤细小血管所致。

由于胆道在肝内的分布是立体树状结构, 梗阻后扩张迂曲, 在 PTCD 过程中需不断调整探头才能实时追踪到引流管的位置。研究发现置管即刻, 可能由于原胆道内压力较高, 部分胆汁迅速被引流出胆道, 局部术前扩张的胆管内径会在短时间内明显减小, 致使引流管显示不清晰, 造成常规超声难以准确判断引流管末端位置, 也无法判断有效引流范围。通过注入超声造影剂, 可清晰显示引流管末端位置和有效引流范围内的肝内胆管树^[9-10]。

因引流孔在引流管末端, 故引流管末端折返、贴附胆管壁等情况均可影响引流效果。本研究结果显示, IB-CEUS 虽不能显示引流孔, 但对引流管末端的显示率达 100%, 明显高于常规超声检查 ($P < 0.001$),

对肝内三级胆管的显示率为 96%,也较常规超声检查高,这与一些学者的研究结果一致^[11-13]。较常规超声,IB-CEUS 可通过调整引流管位置及旋转角度后造影剂的充盈情况,判断是否能充分引流。本研究中,有 7 例患者置管即刻,IB-CEUS 显示肝内胆管树有较大面积充盈缺损,说明引流范围局限,在调整引流管角度、位置后,其中 2 例患者肝内胆管树显示范围明显扩大,而另 5 例患者仍无明显改善。这 5 例患者增加 1 根置管后再次行 IB-CEUS 检查,肝内胆管树显示范围较前明显扩大,说明增加的引流管扩大了有效引流范围。

本研究的局限性在于患者例数相对偏少,对肝内胆管及引流管末端的显示要求操作者具有丰富的术中引导经验,且 IB-CEUS 不具备显示三级以上胆管树的优势。

综上所述,IB-CEUS 可在 PTCD 置管即刻通过对引流管末端位置及肝内各级胆管的显示来预判疗效,及时纠正不当操作,即刻调整引流管位置,指导操作者增加置管数量,以达最佳引流效果,避免患者反复手术,减少了患者的痛苦,对确保 PTCD 成功率及疗效有重要的指导意义。

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