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· 临床研究 ·

经窦道肾镜清创并置管冲洗引流治疗术后腹腔感染4例 并文献复习

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摘要

背景与目的: 术后腹腔感染(PIAI)是腹部外科常见的术后并发症,也是处理棘手的世界性难题,治疗失败率为68.3%,住院病死率高达40.8%。处理该病的关键在于尽早控制感染源,清创与充分引流;感染源延迟控制是预测其治疗失败的独立风险因素。由于不少PIAI病灶位于腹腔内,没有较好的穿刺引流路径;而且再次手术的难度和风险极大,因此控制PIAI的感染源并非易事。笔者报告4例经窦道肾镜清创并置管冲洗引流治疗PIAI患者的诊治经过,以期为临床提供参考和借鉴。

方法: 回顾性分析桂林医学院第二附属医院肝胆胰外科2020年10月—2022年9月收治的4例经窦道肾镜清创并置管冲洗引流治疗PIAI患者的临床资料,并结合文献总结经窦道肾镜处理PIAI的要点。

结果: 4例PIAI患者分别为重症急性胰腺炎穿刺置管引流后右侧腹膜后脓肿,右半肝切除术后肝创面脓肿,腹腔胆总管切开取石T管引流术后胆汁漏及继发性十二指肠瘘,以及胰体尾联合脾脏切除术后胰腺创面脓肿,上述患者经窦道肾镜清创并置管冲洗引流处理:经引流管窦道插入导丝,并在其引导下插入微创扩张引流套件及肾镜,经肾镜冲洗排出脓液和经异物钳夹出脓苔,之后在导丝引导下置入冲洗引流管,术后继续冲洗引流。4例PIAI患者共接受了5次经窦道肾镜清创并置管冲洗引流术,其中1例患者接受了2次;术前置管时间14~58 d,平均38.4 d;其中1例患者同期进行经T管窦道胆道镜取石胆道引流;手术操作时间为30~115 min,平均67.4 min;除1例术中出现少量出血,经鞘管注入稀释去甲肾上腺素液并阻塞鞘管出血停止,其余3例未出现手术并发症;术后置管时间7~30 d,平均20.75 d;经治疗后所有患者PIAI病灶消失,术后随访16~40个月,未见复发。

结论: 经窦道肾镜清创并置管冲洗引流治疗PIAI简单易行,直视下操作避免损伤脏器,安全可靠;不仅能清除脓液及脓苔,更换引流管,而且还可反复操作,效率高,效果显著;特别适合术后腹腔引流管引流不畅且合并包裹性腹腔积液的患者。

关键词

腹腔内感染;手术后并发症;清创术;引流术

中图分类号: R619

Transsinus nephroscopic debridement and catheter irrigation drainage for postoperative intra-abdominal infection: 4 cases report and literature review

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Abstract

Background and Aims: Postoperative intra-abdominal infection (PIAI) is a common postoperative complication in abdominal surgery and a challenging issue worldwide, with a treatment failure rate of 68.3% and an in-hospital mortality rate as high as 40.8%. The key to managing this condition is early control of the infection source, debridement and adequate drainage. Delayed control of the infection source is an independent risk factor for predicting treatment failure. Many PIAI lesions are located deep within the abdominal cavity, lacking optimal routes for percutaneous drainage, and the risks and difficulties of reoperation are significant. Thus, controlling the infection source in PIAI is a difficult task. Here, the authors report the management of 4 PIAI patients treated with nephroscopic debridement and catheter irrigation and drainage via the sinus tract, aiming to provide clinical insights and references.

Methods: The clinical data of 4 patients undergoing nephroscopic debridement, catheter irrigation and drainage for PIAI from October 2020 to September 2022 in the Department of Hepatobiliary and Pancreatic Surgery of the Second Affiliated Hospital of Guilin Medical University were retrospectively analyzed. Key techniques of nephroscopic management of PIAI were summarized and contextualized with relevant literature.

Results: The 4 PIAI cases included a right-sided retroperitoneal abscess after catheter drainage for severe acute pancreatitis, a hepatic abscess at the liver raw surface after right hemihepatectomy, bile leakage and secondary duodenal fistula after laparoscopic choledocholithotomy and T-tube drainage, and a pancreatic abscess at the pancreatic raw surface after distal pancreatectomy with splenectomy. All patients underwent nephroscopic debridement and catheter irrigation and drainage via the sinus tract: guidewires were inserted into the drainage sinus tract, followed by a minimally invasive expansion drainage kit and nephroscopy; pus was irrigated out, and pus moss was clamped out with foreign body forceps under nephroscopy. Then, irrigation drainage tubes were placed under the guidance of the guidewire, and continuous irrigation and drainage were performed. The 4 patients underwent a total of 5 nephroscopic debridement and catheter irrigation and drainage procedures, with one case requiring two operations. The preoperative catheterization time ranged from 14 to 58 d, with an average of 38.4 d. One patient concurrently underwent choledochoscopy for stone extraction and biliary drainage via the T-tube sinus tract. The operative time ranged from 30 to 115 min, with an average of 67.4 min. Aside from one case of minor intraoperative bleeding, which stopped after injecting diluted norepinephrine solution into the sheath and blocking the sheath, there were no surgical complications in the other three cases. The postoperative drainage tube duration ranged from 7 to 30 d, with an average of 20.75 d. After treatment, all PIAI lesions disappeared, and no recurrence was observed during follow-up, which ranged from 16 to 40 months.

Conclusion: Nephroscopic debridement and catheter irrigation and drainage via the sinus tract for PIAI is simple, feasible, and safe, allowing for direct visualization to avoid organ damage. It is effective in removing pus and necrotic tissue, replacing drainage tubes, and can be repeatedly performed with high efficiency and remarkable results. This method is particularly suitable for patients with postoperative abdominal drainage tube obstruction combined with encapsulated intra-abdominal fluid collections.

Key words

Intraabdominal Infections; Postoperative Complications; Debridement; Drainage

CLC number: R619

术后腹腔感染 (postoperative intra-abdominal infection, PIAI) 是腹部外科手术后的常见并发症^[1],也是处理棘手的世界性难题,治疗失败率为68.3%,住院病死率高达40.8%^[2]。处理PIAI的关键在于尽早控制感染源,清创与充分引流^[1],延迟的感染源控制措施是预测其治疗失败的独立风险因素^[3]。由于不少PIAI病灶位于腹腔内,没有较好的穿刺引流路径,而且再次手术的难度和风险极大^[4],因此控制PIAI的感染源并非易事。基于当前“损伤控制”的外科理念^[5],在针对PIAI病因治疗时应选择对生理环境影响最小的干预措施^[6]。笔者团队借鉴前人经皮肾镜清除胰周坏死组织的经验,于2019年首次将肾镜用于胰周脓肿清创并置管引流,之后逐步扩展至PIAI的处理。本文回顾性分析2020年10月—2022年9月采用经窦道肾镜清创并置管冲洗引流治疗PIAI的4例患者的临床资料,并结合文献总结经窦道肾镜处理PIAI的要点。

1 资料与方法

1.1 临床资料

患者1 女,57岁,因“腹部胀痛并发热、呼吸急促8 h”于2020年10月8日入院,CT提示胰头周围及右侧腹膜后大片积液,诊断重症急性胰腺炎。于2020年10月15日行CT引导右侧腹膜后穿刺置管引流,术后第9天CT提示右侧腹膜后积液残留,行经引流管窦道肾镜清创并重新置管冲洗引流,术中创面出血,视野模糊,将肾镜退出并于鞘管内注入2%去甲肾上腺素约30 mL,阻塞鞘管3 min后经肾镜观察发现术区内血凝块聚集,无活动性出血,为避免操作后再次出血将手术终止,经导丝引导置入冲洗引流管。清创术后28 d CT提示右侧腹膜后积液残留,再次经引流管窦道肾镜清创并置管冲洗引流,术后20 d CT提示积液基本消失,拔除引流管(图1)。



图1 重症急性胰腺炎合并右侧腹膜后脓肿经窦道肾镜清创并置管冲洗引流处理 A-E: 重症急性胰腺炎合并右侧腹膜后大片积液,经CT引导右侧腹膜后穿刺置管引流后复查积液残留;F-J: 经窦道肾镜清创,期间创面出血,止血后置管冲洗引流,之后再次经窦道肾镜清创并置管冲洗引流,复查积液消失

Figure 1 Management of severe acute pancreatitis concurrent with right retroperitoneal abscess via sinus tract nephroscopic debridement and catheter irrigation drainage A-E: Severe acute pancreatitis complicated by extensive right retroperitoneal fluid collection, and post-procedural CT scans following right retroperitoneal puncture and catheter drainage under CT guidance revealed residual fluid; F-J: Subsequent sinus tract nephroscopic debridement was performed during which active bleeding from the wound was successfully managed, this was followed by catheter irrigation drainage, and further nephroscopic debridement and catheter irrigation drainage through the sinus tract were implemented, with subsequent imaging confirming the resolution of the fluid collection

患者2 男, 35岁, 因“车祸致右肝破裂2 h”于2021年10月9日入院, 诊断右肝破裂并腹腔内大出血, 行右半肝+胆囊切除, 同时放置肝创面引流管。术后第17天CT提示肝创面大片积液, 经橡胶引流管开小口插入吸痰管后冲洗并负压引流;

术后第23天CT提示肝创面积液较前缩小; 术后第57天行经肝创面引流管窦道肾镜清创并置管冲洗引流, 清创术后第7天CT提示肝创面积液消失, 拔除引流管(图2)。

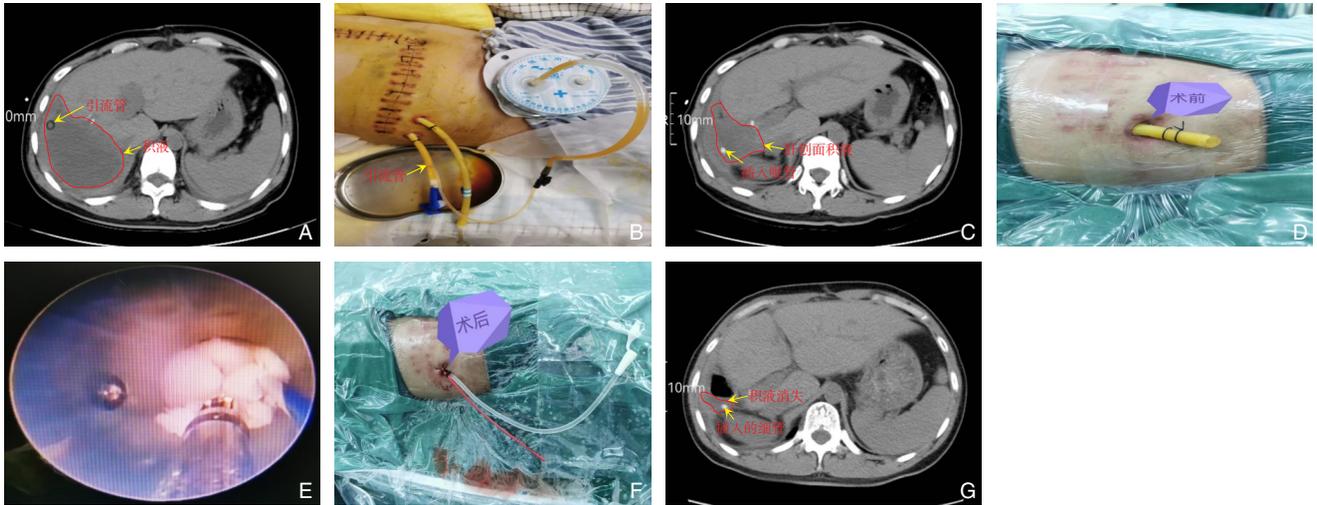


图2 肝切除术后肝创面大片脓肿经引流管插细管冲洗负压引流及经窦道肾镜清创并置管冲洗引流处理 A-C: 肝创面大片积液, 经橡胶引流管开小口插入吸痰管后冲洗并负压引流, 复查CT肝创面积液较前缩小; D-G: 术区贴防水膜, 肾镜直视下异物钳夹取病灶脓苔, 操作完毕后经窦道置入冲洗引流管, 复查CT肝创面积液消失

Figure 2 Management of extensive abscesses on the hepatic resection surface following hepatectomy through a multifaceted approach involving small-tube irrigation via a drainage tube, negative pressure drainage, and debridement using a nephroscope through the sinus tract, complemented by subsequent placement of an irrigation drainage tube A-C: A significant fluid accumulation was noted on the hepatic surface, management involved creating a small orifice in the rubber drainage tube to insert a suction catheter for irrigation and negative pressure drainage, and subsequent CT imaging demonstrated a marked reduction in the size of the fluid collection; D-G: A waterproof membrane was applied to the operative field, under direct visualization provided by a nephroscope, the lesion was meticulously debrided using foreign body forceps, upon completion of the debridement, an irrigation drainage tube was placed via the sinus tract, and follow-up CT imaging confirmed the complete resolution of the fluid collection on the liver surface

患者3 女, 66岁, 因“反复右上腹胀痛2年, 畏寒发热3 d”于2022年9月9日入院, 既往30年前行开腹肝左外叶切除+胆囊切除+胆总管切开探查取石T管引流术, 诊断复发性肝胆管结石并急性胆管炎, 行腹腔镜下胆总管切开探查取石T管引流术, 同时放置温氏孔引流管。术后第1天温氏孔引流管引出胆汁; 术后第11天温氏孔引流管仍引出胆汁, 无腹膜炎表现, 予带管出院; 术后第53天进食后温氏孔引流管引出食物, 上腹部CT及T管

造影显示十二指肠瘘, 经禁食、肠外营养、生长抑素、抑制胃酸、抗感染等治疗3 d, 进食后温氏孔引流管又引出食物; 术后第56天行经T管窦道胆道镜取石胆道引流+经温氏孔引流管窦道肾镜清创并置管冲洗引流, 术后经禁食及引流管冲洗等措施处理, 12 d后CT提示十二指肠瘘愈合, 进食后无消化漏, 拔除温氏孔引流管及胆道引流管(图3)。

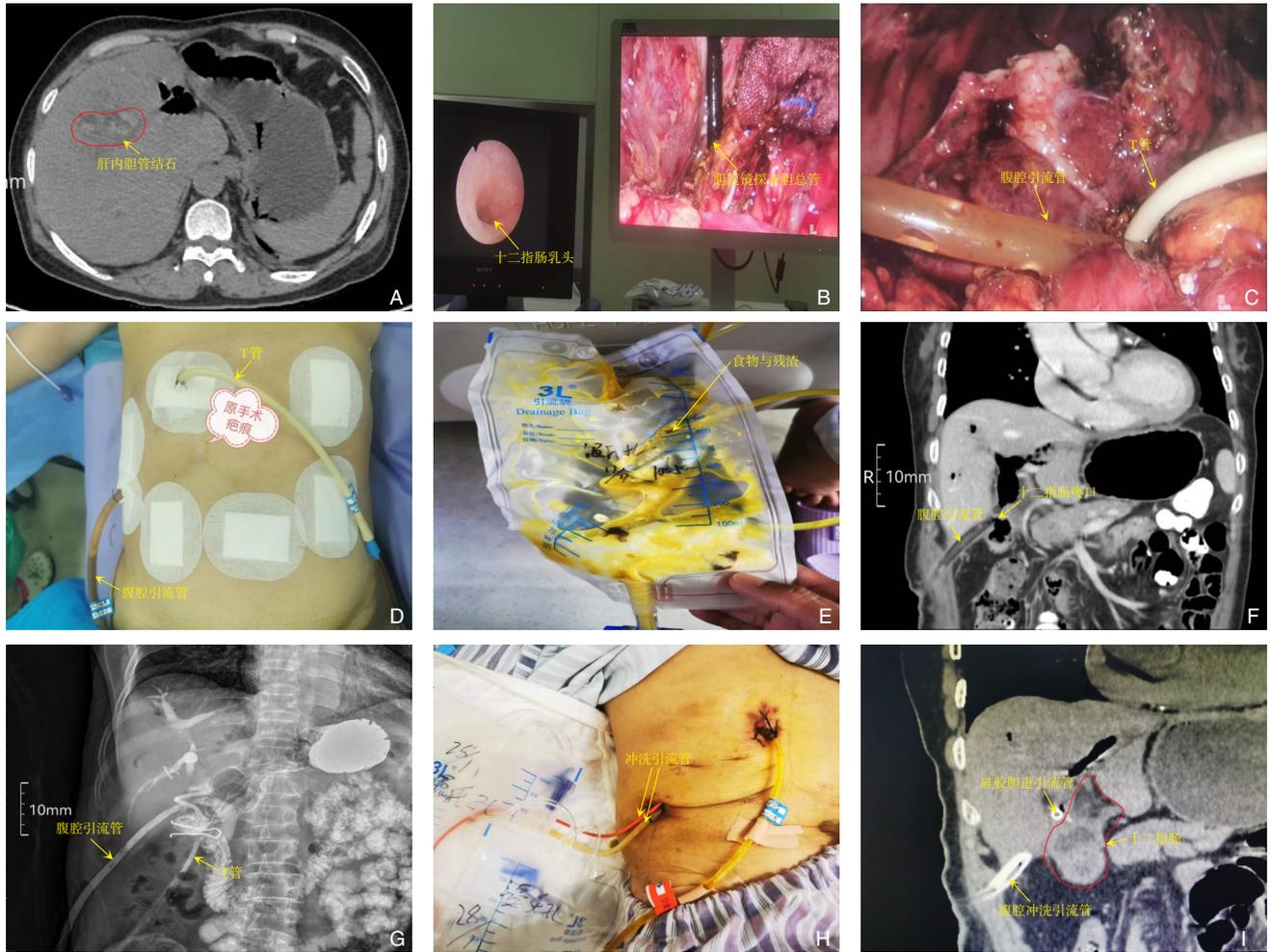


图3 腹腔镜胆总管切开取石T管引流术后胆汁漏及继发性十二指肠瘘经窦道肾镜清创并置管冲洗引流处理 A-D: 复发性肝胆管结石, 行腹腔镜下胆总管切开探查取石T管引流术, 同时放置温氏孔引流管; E-I: 进食后引温氏孔引出食物, CT及T管造影提示十二指肠瘘, 经T管窦道胆道镜取石胆道引流+经温氏孔引流管窦道肾镜清创并置管冲洗引流, 术后复查十二指肠瘘愈合

Figure 3 Postoperative management of bile leak and secondary duodenal fistula following laparoscopic choledochotomy with T-tube drainage A-D: Recurrent hepatobiliary calculi were addressed via laparoscopic choledochotomy and stone extraction, followed by T-tube drainage and the concurrent placement of a Winslow foramina drainage tube; E-I: Postprandial efflux through the Winslow foramina revealed the presence of food particles, CT and T-tube cholangiography confirmed the diagnosis of a duodenal fistula, the therapeutic strategy included endoscopic lithotripsy and biliary drainage through the T-tube sinus tract, supplemented by nephroscopic debridement, irrigation, and drainage via the Winslow foramina drainage tube, and postoperative follow-up validated the complete resolution of the duodenal fistula

患者4 男, 22岁, 因“车祸致腹、腰及胸部损伤2 h”于2022年10月28日急诊入院, 诊断开放性腹部损伤: 小肠外露; 小肠、胰体、脾、左肾损伤; 腹腔积液; 膈肌破裂; 胸腔积液, 急诊行胰体尾+脾+左肾切除+部分小肠切除+小肠+膈肌修补+腹腔冲洗引流+胸腔闭式引流术, 同时放置脾窝及胰腺断面放置引流管经左侧腹壁引出。

术后第23天CT提示胰腺断面及左侧腹壁下包裹性积液; 经超声引导穿刺左侧腹壁下包裹性积液并置冲洗引流管, 见脓性液引出; 术后第26天CT提示胰腺断面积液依然残留, 次日行经胰腺断面引流管窦道肾镜清创并置管冲洗引流, 术后25 d CT提示胰腺断面积液消失, 拔除腹腔引流管(图4)。

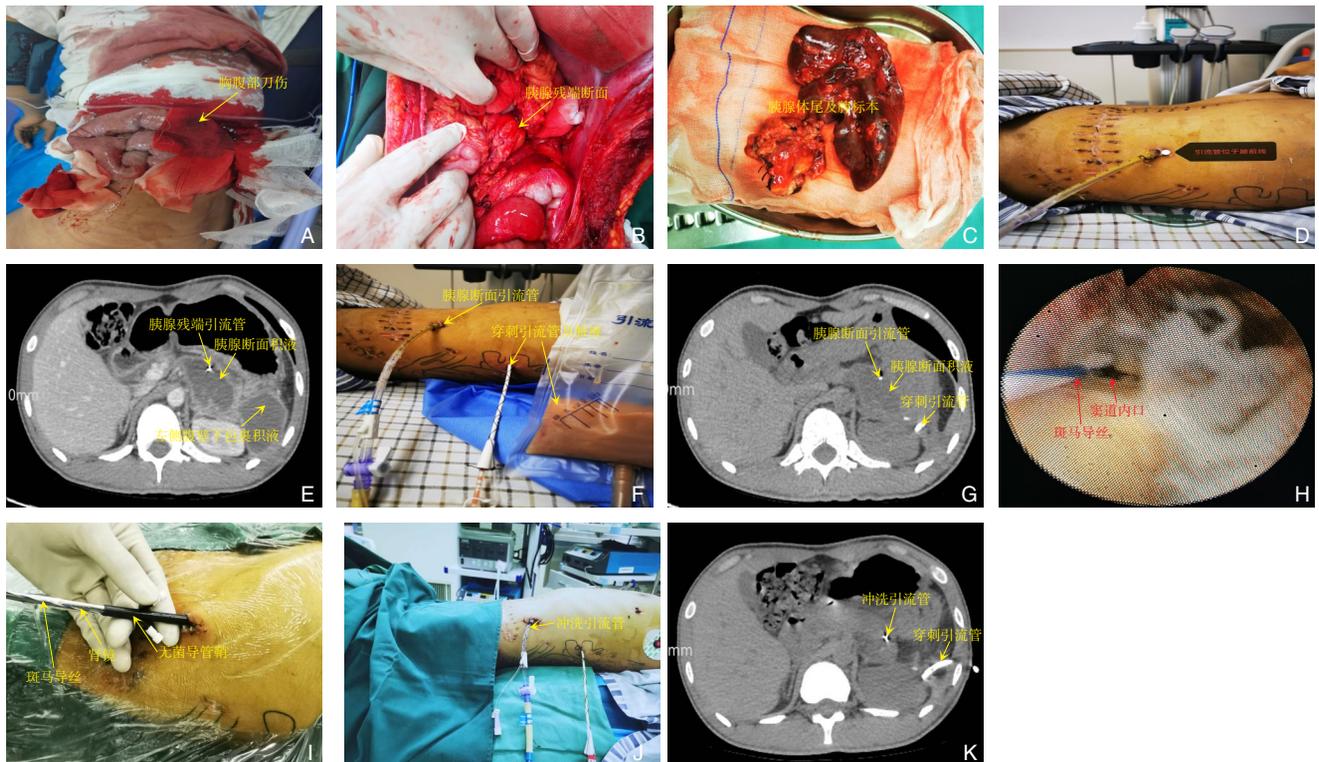


图4 胰体尾联合脾脏切除术后胰腺创面脓肿经窦道肾镜清创并置管冲洗引流处理 A-D: 开放性腹部损伤行胰体尾联合脾脏切除术; E-G: CT提示胰腺断面及左侧腹壁下包裹性积液, 行超声引导下穿刺置管引流, 复查CT提示胰腺断面积液残留; H-K: 经窦道肾镜清创并置管冲洗引流, 复查CT提示胰腺断面积液消失

Figure 4 Management of pancreatic abscess after distal pancreatectomy and splenectomy via sinus tract nephroscopic debridement and catheter irrigation drainage A-D: Open abdominal trauma managed with distal pancreatectomy and splenectomy; E-G: CT imaging demonstrates encapsulated fluid accumulation at the pancreatic resection margin and left lower abdominal wall, and ultrasound-guided percutaneous catheter drainage was performed, with subsequent CT imaging indicating residual fluid at the resection site; H-K: Sinus tract nephroscopic debridement followed by catheter irrigation drainage was conducted, with follow-up CT imaging confirming the resolution of fluid collection at the pancreatic resection site

1.2 经窦道肾镜清创并置管冲洗引流术

患者取仰卧位, 手术侧适当垫高; 常规消毒铺巾, 术区贴防水膜并连接接水袋; 肾镜连接光源并常规调整白平衡, 进水孔连接等渗冲洗液备用; 于腹腔引流管近皮肤外侧3~5 cm处将其剪断, 经引流管外口将斑马导丝头端插入至腹腔感染灶内, 将斑马导丝固定避免脱出并拔除腹腔引流管, 在斑马导丝的引导下将与腹腔引流管管径相近的微创扩张引流套件(湖南瑞邦医疗科技发展有限公司, 批号2020092, 常用套件有F14、F16、F18、F20)插入引流管窦道内, 拔除套件内芯, 在斑马导丝引导下将肾镜插入套件外鞘(以下称“鞘管”), 打开连接肾镜的冲洗液, 在肾镜直视下将鞘管循窦道方向缓慢推送至腹腔感染灶内, 此时可拔除斑马导丝。冲洗液经肾镜进入脓腔, 脓液经肾镜镜身与鞘管之间的缝隙流出; 过程中间断

将肾镜退出鞘管外, 方便游离的脓苔经鞘管排出; 还可以将肾镜连接负压吸引器将脓液吸出。若遇到脓腔内的附壁脓苔及坏死组织不能冲出, 经肾镜操作孔插入异物钳轻柔将脓苔及坏死组织夹出, 过程中需注意避免夹伤血管或脓肿壁肉芽组织造成出血或穿孔。脓腔冲洗清创结束后经肾镜操作孔将斑马导丝插入到脓腔内, 通过肾镜测量窦道外口与脓腔的距离作为冲洗引流管留置在腹腔内的长度, 在斑马导丝的引导下将冲洗引流管置入脓腔内, 同时避免引流管顶住脓腔壁, 以免长久压迫导致脓腔壁周围脏器损伤或出血。术后经引流管灌液冲洗使腔内积液排出, 为残腔愈合创造有利条件。冲洗过程中要注意是否存在排出的脓苔阻塞引流管, 特别是引流管与引流袋连接处较窄容易出现阻塞(视频1)。



视频1 经窦道肾镜清创并置管冲洗引流术

Video 1 Transsinus nephroscopic debridement and catheter irrigation drainage

扫描至移动设备观看手术视频:



<http://www.zpwz.net/zgptwkzz/article/html/PW240182>

1.3 治愈拔管指征

患者同时满足以下条件时可将其拔除或更换为管径较细的引流管,之后逐步退管^[7-10]:(1)腹部

胀痛消失,饮食及大便基本正常;(2)体温低于37.3℃,持续时间超过3d;(3)腹部无明显压痛;(4)腹腔引流管引流量<10 mL/d或无脓性液引出;(5)白细胞计数为4~10×10⁹/L,持续时间超过3d;(6)胰腺术后患者引流液淀粉酶定量小于血淀粉酶的3倍;(7)腹部CT检查提示单个病灶直径<2cm,或者多个病灶直径均<2cm且与之前对比病灶趋于缩小或消失。

2 结果

4例PIAI患者共接受了5次经窦道肾镜清创并置管冲洗引流术,其中病例1接受了2次;术前置管时间14~58d,平均38.4d;其中1例患者同期进行经T管窦道胆道镜取石胆道引流;手术操作时间为30~115min,平均67.4min;除1例出现术中少量出血外,其余3例未出现手术并发症;术后置管时间7~30d,平均20.75d;经治疗后所有患者PIAI灶消失,术后随访16~40个月,未见复发(表1)。

表1 4例经窦道肾镜清创并置管冲洗引流治疗PIAI患者的诊治过程

Table 1 Diagnosis and treatment of 4 PIAI patients with transsinus nephroscopic debridement and catheter irrigation and drainage

序号	性别	年龄(岁)	原发病	PIAI情况	术前置管时间(d)	手术方式	手术时间(min)	手术并发症	术后置管时间(d)	随访时长(月)	随访结果
患者1	女	57	重症急性胰腺炎并胰周脓肿	右侧腹膜后脓肿	14(第1次手术前)	第1次手术:经窦道肾镜清创并置管冲洗引流	115(第1次手术)	(第1次手术出血)	—	—	—
					42(第2次手术前)	第2次手术:经窦道肾镜清创并置管冲洗引流	50(第2次手术)	无(第2次手术)	30	40	第2次手术:无复发
患者2	男	35	右肝破裂	右肝创面脓肿	58	经窦道肾镜清创并置管冲洗引流	30	无	7	16	无复发
患者3	女	66	复发性肝胆管结石并胆管炎	肝内胆管结石,胆汁漏,十二指肠痿	53	经T管窦道胆道镜取石胆道引流+经窦道肾镜清创并置管冲洗引流	90	无	23	17	无复发
患者4	男	22	开放性腹部损伤:胰+脾破裂	胰腺断面脓肿	25	经窦道肾镜清创并置管冲洗引流	52	无	23	17	无复发

3 讨论与文献复习

3.1 PIAI发生及PIAI引流不畅的原因

PIAI的发生与局部组织缺血、坏死,炎性渗

出,异物残留,引流不畅以及全身免疫力下降有关^[11]。其中,引流不畅可导致局部液体聚集,进而导致病菌繁殖,炎性渗出加重,组织愈合修复能力下降。同时,由于局部内部血流下降或缺失,

机体免疫细胞及外源性抗感染药物难以到达以消灭病菌，因此，引流不畅是PIAI发生的关键因素。本文4例患者PIAI的原因均与上述因素，特别是引流不畅有关。引流管引流不畅与病灶积液黏稠、流动性差、坏死组织及脓苔或异物阻塞引流管以及引流管位置高于病灶水平致使积液无法外流有关。本研究中患者1、患者2和患者4 PIAI引流不畅的原因为积液黏稠以及引流管位置高于病灶水平。患者3术后胆汁漏的原因是胆总管结石取出后胆总管腔内压力下降，肝内胆管结石崩解掉入胆总管，使胆汁从胆总管流入十二指肠不畅，胆总管内高压使胆汁从胆总管切开处漏出；而持续胆汁漏导致周围十二指肠水肿，温氏孔腹腔引流管擦破或顶破十二指肠，进而出现十二指肠瘘。

3.2 PIAI引流不畅的处理措施

疏通引流管的方法包括捏挤引流管、注射器冲洗引流管、经引流管插入细导管后冲洗以及在引流管窦道形成后将原引流管拔除后重新置管。捏挤或注射器冲洗引流管是处理引流不畅的最简便操作，当达不到疏通效果时可经引流管开小口后插入细管冲洗并负压引流，本研究中患者1采取此种办法，肝创面积液减少，但积液未完全消失。

经皮超声或CT引导穿刺置管引流是处理PIAI的常用微创措施，但该方法要求有合适的经皮穿刺路径，避免穿刺过程损伤腹腔内脏器^[2]；感染灶内积液不宜太黏稠，以免置管后仍引流不畅；穿刺点应选择在积液低位以使置管后积液能顺畅流出。本文患者1和患者2术后腹腔残留积液不采用穿刺置管引流处理的原因主要是CT显示病灶密度高，提示坏死组织多，积液黏稠度大和流动性差，穿刺后引流不畅概率大，效果差。患者4不考虑经皮穿刺置管引流的原因是病灶位于腹腔内，无经皮穿刺路径。患者3处理的关键在于取尽胆道内结石，恢复胆道内引流，避免胆汁外漏并通畅引流，非经皮穿刺置管引流能解决。

PIAI患者腹腔内局部炎症、水肿及开腹手术后粘连形成，再次手术分离粘连、寻找感染灶就变得极为困难，极易导致腹腔内出血及肠瘘等严重副损伤^[8]，且不符合损伤控制外科理念，因此外科手术干预仅作为最终的补救方案。

经引流管窦道纤维胆道镜清创后置管引流是近年处理PIAI病灶的新方法，具有可视化操作、安全、容易重新将引流管放到感染灶的优势，文

献报道效果良好^[13-14]。然而笔者在临床操作中发现，由于纤维胆道镜镜身管径与引流管窦道大小相当，加上纤维胆道镜无吸水装置和排水通路，导致：(1)冲水后无法及时排出，水流的波动造成视野模糊^[15]；(2)冲水后感染灶内呈高压状态，感染灶内细菌和毒素反流入血导致菌血症或脓毒血症；需要将纤维胆道镜退出至窦道外待冲洗液和脓液排出后才能重新插入进行下一循环操作，而纤维胆道镜反复进出不仅影响手术效率，而且还会增加窦道损伤出血的概率；(3)当感染灶包裹不佳时，冲洗液会弥散至周围间隙造成感染扩散。有学者^[13]通过多管引流（至少2管），经窦道纤维胆道镜清创时形成冲洗回路通路可避免上述问题；(4)纤维胆道镜镜身柔软，方向感和稳定性差。在纤维胆道镜辅助下用取石网篮套取脓苔或用异物钳夹除感染灶附壁脓苔时不仅费劲，而且还容易损伤脓肿壁造成出血或穿孔。

经窦道肾镜清创处理PIAI可避免上述缺陷，因为肾镜具有排水侧孔，鞘管和肾镜镜身之间有排水间隙以及肾镜可连接负压吸引器能及时排出脓腔内冲洗液，同时硬直镜身及鞘管以窦道外口皮肤作为支点，操作时方向感和稳定性好，不易损伤脓肿壁^[16-17]。2000年，Carter等^[18]等首次成功开展经皮肾镜胰周坏死组织清除术。2003年，英国利物浦大学^[19]进一步报道经皮肾镜治疗重症急性胰腺炎合并感染性胰腺坏死的手术方法。国内蔡守旺等^[15]于2008年率先开展腹膜后入路经皮肾镜清除感染性胰腺坏死的治疗。此后屡见经肾镜清创处理重症胰腺炎胰周脓肿的报道^[7,15,18-27]。

3.3 经窦道肾镜清创并置管冲洗引流治疗PIAI的时机

关于经窦道肾镜处理PIAI的时机，有学者^[17]采取一期穿刺扩创肾镜清创置管引流处理重症胰腺炎合并腹膜后积液，此时尽管没有软组织窦道，但通过鞘管通道也能完成感染灶的冲洗、清创和置管并取得良好效果。另有学者^[16]在经皮穿刺引流后1周，将引流管窦道扩张后经肾镜清创置管引流处理重症急性胰腺炎并发胰周坏死，取得良好效果。朱帅等^[9]认为如果经皮穿刺路径为腹膜后，一般间隔3~5 d即可；如果经皮穿刺路径为经腹腔，需要适当延长间隔时间，至少在1周以后，一般在2周或以上待形成牢固的窦道后再进行手术。根据既往胆总管切开T管引流后2周拔除T管的经

验^[28],笔者认为引流管放置2周左右,管周可形成相对完整的软组织窦道,此时腹腔感染灶亦逐步局限并包裹,经肾镜清创可避免窦道撕裂、感染灶液体往腹腔蔓延及脓血反流^[20-21,29]。笔者经窦道肾镜清创处理PIAI的时间一般是在引流管放置后14~58 d,没有出现窦道损伤和明显积液反流感染。

3.4 经窦道肾镜清创并置管冲洗引流治疗PIAI的技术要点

经窦道肾镜清创前需仔细阅读患者腹部CT影像,了解病灶部位、大小、形态、内容物性质、脓肿壁厚度、窦道走形、长度及角度,以及病灶周围脏器情况,评估经皮穿刺置管引流和经窦道肾镜清创的可行性及效果,选择适当的处理措施;根据经窦道肾镜清创手术操作流程,判断手术过程中进鞘的大致方向和深度,术中可能发生的风险和注意事项,以及手术大概所需时间^[7,9]。笔者有1例PIAI患者,由于经窦道肾镜清创术前引流管已后退了1~2 cm,致使引流管前端与感染灶之间有软组织间隔,术中找不到病灶内口,无法清创;另1例PIAI患者,病灶狭长且中间有细段,留置的猪尾巴穿刺引流管每天引流液少于10 mL,术中置入导丝后将引流管拔除,进镜后无法找到病灶内口,分析原因可能是猪尾巴引流管在脓腔内时将脓腔撑起来,猪尾巴引流管拔出后脓腔塌陷,特别是脓腔中的细段闭合,最终无法清创,手术失败。

经窦道肾镜清创并置管引流可根据患者全身状况选择气管插管全身麻醉或局部麻醉。前者操作时,患者舒适度佳,术者亦更能从容处理腹腔内感染灶;而后者可避免全身麻醉对患者的二次打击^[16,20]。但不论采用哪种麻醉方法,术中都要确保麻醉深度合适,确保患者体位不动,以免手术器械损伤窦道或病灶。

经窦道肾镜清创并置管引流需用导丝指引,循窦道管腔进鞘管和肾镜,避免损伤窦道或脓肿壁导致出血和穿孔。当窦道弯曲度较大时,为避免硬直鞘管损伤窦道,可先利用软质纤维胆道镜引导将导丝置入窦道最深处再更换肾镜^[10,15,20,22]。

虽然经窦道肾镜清创时鞘管与窦道外口皮肤形成操作支点,稳定性好,相对纤维胆道镜更方便探查和处理脓腔各个方位积液和脓苔,但肾镜清创时动作依然要轻柔,应尽量避免用力撕扯附壁脓苔引发出血或穿孔。由于感染性胰腺坏死及

胰周脓肿的液化是一个渐进性的过程,同时坏死组织周围常伴有裸露的血管,因此肾镜清创时不必追求一次性将半固体状附壁坏死组织全部清除。清创置管引流后残留的坏死组织容易崩塌脱落,二次清创时相对简单和安全^[7,9,13,20-21,24-25,30-31]。肾镜清创时若发生出血,需先判断是组织渗血还是血管断裂出血,前者出血时可通过退出肾镜插入鞘管内芯,经鞘管内芯注入稀释的去甲肾上腺素液以及注射用白眉蛇毒血凝酶^[13],并用手堵塞鞘管外口,数分钟后多可使渗血停止;后者出血量大,由于脓腔和窦道空间小,加上肾镜下单孔操作,通常不能用钳夹住出血血管,因此需在前者止血的基础上严密观察患者的血流动力学情况,必要时采用介入栓塞止血或开腹手术止血^[8,21,25-26,32-33]。

导丝是经窦道肾镜清创手术过程中的指路明灯,不仅能安全引导鞘管及肾镜进入感染灶内,在手术结束前还可引导冲洗引流管置入病灶部位^[10]。术后可继续冲洗引流,使脓腔内的炎性渗液进一步排出,促进局部炎症消退,脓腔回缩。术后复查CT了解腹腔感染情况,当需要再次清创可经窦道再次或多次清创^[16]。

3.5 经窦道肾镜清创并置管冲洗引流治疗PIAI的优缺点

PIAI的发生多与引流管放置不当或坏死组织阻塞致使积液无法排出有关;此类积液多位于引流管前端并被周围脏器和组织包裹;借助引流管窦道将肾镜伸入,清除病灶内容物并重新放置冲洗引流管,术后冲洗引流可使PIAI获得治愈。经窦道肾镜清创并置管冲洗引流治疗PIAI简单易行,直视下操作避免损伤脏器,安全可靠;不仅能清除脓液及脓苔,更换引流管,而且还可反复操作,效率高,效果显著;特别适合术后腹腔内包裹性积液且引流不畅的患者^[9]。然而该技术亦存在局限,包括:(1)操作上比普通疏通引流管及经皮穿刺置管引流复杂,只有在上述措施达不到通畅引流或预计效果不佳时才会考虑;(2)下列情况适合使用:腹腔内感染灶与皮肤之间没有窦道;窦道时间短或不牢固;PIAI灶多发且不相通时^[34];(3)操作中用的扩张套件、肾镜和异物钳质地坚硬,而窦道质地相对柔软,操作过程中若不循窦道腔进出鞘管或肾镜,或者异物钳用力拉扯尚未完全坏死的组织,可导致窦道和脓肿壁损伤引起出血和消化道穿孔;(4)由于鞘管管径和异物钳开口小,

当PIAI灶范围广，坏死感染组织较多时，手术操作耗时较长。本研究中患者1的PIAI灶较其他病例广，手术耗时较其他病灶长，达115 min。若术前每隔3~5 d逐级扩张窦道至30 F，肾镜清创时可采用更粗的鞘管，清创时间会缩短^[8]；(5)手术过程出现血管出血，无法像腹腔镜或小切口视频辅助清创那样用血管钳夹止血，只能寄希望于注药后压迫鞘管止血、动脉栓塞或开放手术止血^[8-9,31,35]；(6)遇到术后腹腔脓肿壁厚，清创引流后脓腔回缩不佳时，需行腹腔镜或开腹脓腔空肠吻合处理^[16,22]。

综上所述，通过本文4例PIAI病例经窦道肾镜清创并置管冲洗引流处理得出，该技术具有操作简便，可视化清创，安全高效，容易止血和反复实施的优势；虽然不同PIAI患者病情各异，而且该技术有其相应的操作指征和规范，但是只要术前认真分析患者病情，术中规范操作，术后认真观察，相信该技术会在PIAI处理中发挥更大的作用。

利益冲突：所有作者均声明不存在利益冲突。

作者贡献声明：本研究由吴嘉兴负责设计；文中4例患者病情分析、手术操作和术后管理由所有作者共同参与，临床随访和论文写作由吴嘉兴完成。

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