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• 专题报道 •

## 机器人辅助腹腔镜下儿童肾脏异物取出 1 例报告

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**[摘要]** **目的** 报道 1 例机器人辅助腹腔镜下儿童肾脏异物取出病例的手术过程, 为儿童内脏异物取出提供参考。**方法和结果** 1 例 2 岁女性患儿因“X 线平片检查发现右肾异物 1 个月”入院。曾误诊为消化道异物, 保守观察 3 周余未排出, 就诊于我院后进一步完善检查, 腹部 CT 提示右肾异物。应患儿家长要求进行机器人辅助腹腔镜探查, 术中探查见异物位于右肾下极, 完整取出一针形金属异物。术中出血及损伤小, 定位准确。术后随访 44 个月无异常。**结论** 机器人辅助腹腔镜技术可应用于儿童肾脏异物取出, 为儿童内脏异物的取出提供了一种新的手段。

**[关键词]** 机器人手术; 腹腔镜技术; 儿童; 肾脏异物

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### Robot-assisted laparoscopic surgery in removing renal foreign body in a child

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**[Abstract]** **Objective** To report the surgical procedure of removing renal foreign body by robot-assisted laparoscopic surgery in a child, so as to provide reference for future incidence. **Methods and Results** A 2-year-old girl was admitted to the hospital for a foreign body in right kidney, which had been found by abdomen X-ray for 1 month. She had been misdiagnosed as having a gastrointestinal tract foreign body, and it was not discharged after conservative observation for more than 3 weeks. Further examination was performed in our hospital, and abdominal computed tomography showed a foreign body in the right kidney. Robot-assisted laparoscopic surgery was conducted at the request of her parents. A foreign body was found in the inferior pole of the right kidney, and was intactly removed. The foreign body was a metal needle. The intra-operative blood loss was less and injury was small, with accurate location. No abnormal findings were noted during a follow-up of 44 months. **Conclusion** Robot-assisted laparoscopy can be used for pediatric renal foreign body removal, which provides a new method for removing visceral foreign bodies in children.

**[Key words]** robotic surgical procedures; laparoscopy; children; renal foreign body

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近年来,随着达芬奇(da Vinci)手术机器人系统的推广,机器人外科手术已逐渐普及。机器人辅助腹腔镜手术具有多关节“内腕”手术系统,较腹腔镜操作更为灵活,且可过滤震颤增加稳定性,同时 3D 视野使空间定位更加准确,可降低手术操作难度、减少组织副损伤,应用较为广泛。但目前机器人辅助腹腔镜技术在异物取出中的应用少见报道,仅有魏志刚团队报道了 1 例采用机器人辅助腹腔镜取出成人胰头异物病例,他们的体会是机器人能消除或减少手部操作过程中的颤动,在提高手术

精准度的同时极大减轻副损伤,而且在邻近重要脏器的狭小空间里操作极为有利<sup>[1]</sup>。目前尚未见机器人辅助腹腔镜手术应用于儿童肾脏异物处理的相关报道。我们通过机器人辅助腹腔镜技术成功对 1 例患儿完成肾脏异物取出,现报告如下。

### 1 方法和结果

1.1 病例资料 患儿,女,2 岁,主因“X 线平片检查发现右肾异物 1 个月”于 2016 年 11 月 21 日入院。患儿入院前 1 个月因怀疑红枣吞入史就诊

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于当地医院,行腹部X线平片检查发现右侧腹部异物,考虑消化道异物可能,接受观察随访。观察3周余仍未排出异物,随访腹部X线平片提示异物仍位于原位(图1A)。为进一步治疗,就诊于我院。体格检查未见右侧腰腹部局部皮肤异常,腹部CT提示右肾下极一长形钉状金属密度影,长约1.7 cm,局部肾皮质凹陷(图1B),考虑右侧肾脏异物。追问病史,患儿无腹痛、腹胀、恶心、呕吐、尿液浑浊、血尿等表现,无法确认异物来源及进入体内方式。患儿家长情绪焦虑,要求行机器人辅助腹腔镜手术探查并取出异物。

1.2 手术过程 2016年11月24日,患儿经气管插管全身麻醉后,行达芬奇手术机器人系统(da

Vinci Si)智能机械臂辅助腹腔镜下腹腔探查。留置导尿,取左侧45°卧位,10 mm腹腔镜套管位于脐左缘,2个8 mm操作套管分别位于前正中线脐上6 cm及脐右下6 cm与胸骨旁线交点处(图1C)。术中未见腹腔内粘连,侧腹膜完整,打开右侧侧腹膜及右肾周筋膜,见右肾下极肾周组织有瘢痕形成,沿瘢痕组织周围0.5 cm分离清晰后,见局部肾脏皮质凹陷,异物尾端外露,外露段长约2.0 mm(图1D)。用Maryland抓钳夹住金属针尾端,轻柔拔出(图1E)。异物长约1.7 cm,与CT测量长度相同(图1F)。术中超声扫描未见异物残留,无活动性出血,术后无殊。随访44个月,未发现明显异常。

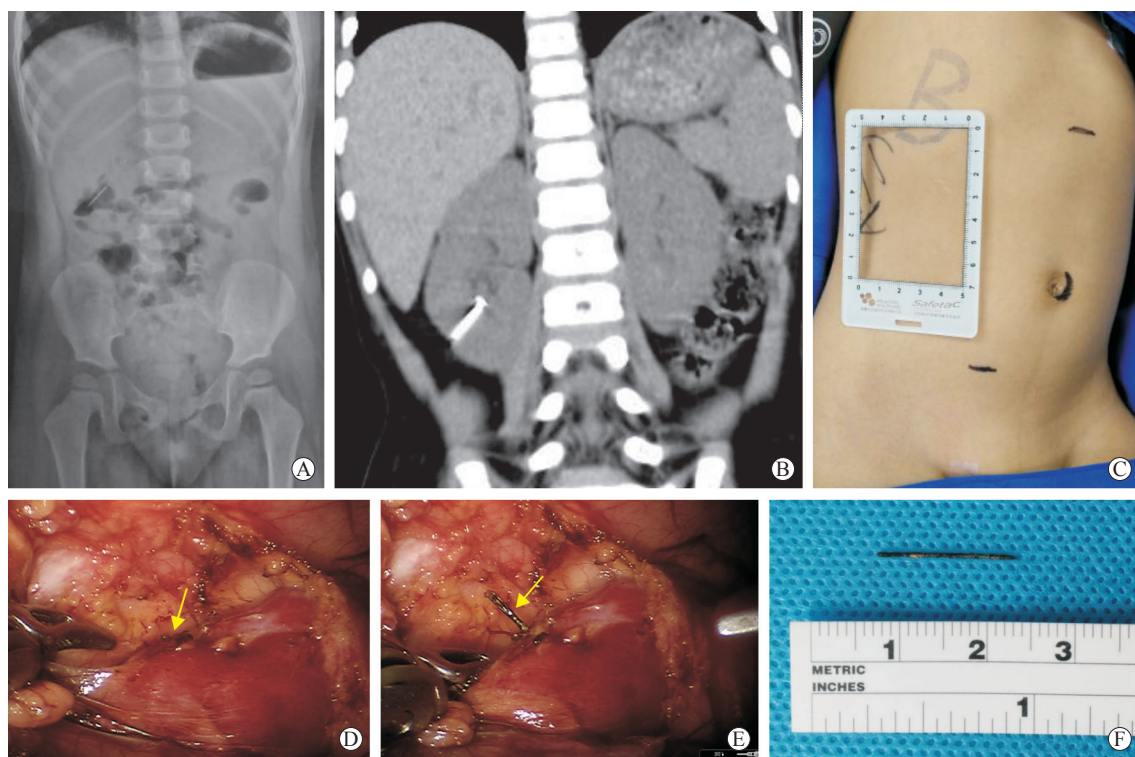


图1 儿童肾脏异物术前影像学表现及机器人辅助腹腔镜手术过程

Fig 1 Preoperative imaging and robot-assisted laparoscopy for removing pediatric renal foreign body

A: Preoperative abdominal X-ray showed foreign body on the right side, with poor transparency, and with no free gas under the diaphragm, no intestinal obstruction and other abnormal manifestations; B: CT scan revealed an extremely high density shadow of the lower right kidney, with a length of about 1.7 cm; C: The position of robotic trocar; D: Scar formation can be seen in the perirenal fascia around the lower pole of the right kidney, local renal cortical depression (the arrow points to the tail end of the metal foreign body exposed outside the renal cortex); E: Partial removal of needle-shaped metal foreign body (the arrow points to the metal foreign body); F: A needle-shaped metal foreign body was taken out. CT: Computed tomography

## 2 讨论

消化道异物是最常见的儿童伤害之一,80%的消化道异物发生于儿童,3岁以前是高发年龄段,通常为误吞<sup>[2]</sup>。但80%~90%的消化道异物可自

行排出<sup>[3]</sup>,不需要特殊处理。本例患儿初期在外院行腹部X线平片检查发现右侧腹部异物,考虑为误吞引起的消化道异物,保守观察3周后,腹部X线平片随访提示腹部异物位置无变动,为求进一步诊治转入我院。根据美国消化内镜协会指南<sup>[4]</sup>,



尖锐异物随访3 d影像学无改变应考虑内镜干预。在手术干预前应完善CT检查,因CT灵敏度及空间分辨率明显高于X线平片,而且可了解毗邻组织情况及周围是否有炎症等,还可明显减少诊断时间、增加准确性<sup>[5]</sup>。本例患儿腹部CT结果提示右侧肾脏异物。异物进入肾脏的途径主要有经体表穿入、下尿路逆行和消化道迁移3种方式,其中经消化道迁移途径最少见。本例患儿年龄小,无法叙述病史,家长亦无法明确异物进入体内的途径,虽有可疑异物吞入史,但无明显消化道症状,腹部X线平片及CT未见膈下游离气体,初步可排除异物经消化道迁移至肾脏;术中探查异物位于右侧肾脏实质,右肾下极肾周组织瘢痕形成,肾皮质凹陷,故考虑异物经体表穿入可能性大。

关于儿童肾脏异物处理的文献报道较少。结合成人肾脏异物的处理经验,肾脏异物的处理包括保守观察及手术治疗。Sofer等<sup>[6]</sup>报道了1例15岁女孩急性重症创伤的病例,急诊剖腹探查止血,同时取出皮下穿入的金属针,术中因后腹膜出血未再增多而未打开后腹膜探查,但术后第1天随访腹部X线平片提示右上腹异物,完善CT检查提示右肾异物,血管造影未见血管损害,考虑患儿情况特殊且此处异物未引起任何尿路症状,决定随访,但需每年复查尿常规、尿培养、肾功能及腹部X线平片,如出现症状需及时处理。Upadhyay等<sup>[7]</sup>报道了1例异物经消化道移行至右侧肾脏的病例,患者拒绝手术保守治疗后反复出现血尿及腰痛,最后经逆行性肾造口术取出。另有文献报道慢性肾脏异物如不取出可诱发肿瘤形成<sup>[8-9]</sup>。本例患儿家长无法接受异物残留患儿体内,要求行机器人辅助腹腔镜手术探查。

手术探查方式包括开放手术、腹腔镜手术等。Almuallem等<sup>[10]</sup>报道了1例4岁男性患儿误吞金属发卡的病例,因误吞的金属发卡经十二指肠后壁穿透后部分穿至右侧肾脏,导致患儿出现腹痛及泌尿系感染等症状,后行剖腹探查并取出异物,同时修补十二指肠穿孔。但本例患儿异物明确位于肾脏,无消化道穿孔等并发症,开腹探查意义不大,且开放手术创伤大,检索近10年文献,已无行开放手术探查取出单纯肾脏异物的报道。Tan等<sup>[11]</sup>报道了2例腹腔镜手术取出成人肝脏异物的病例,术中应用超声准确定位异物位置,为手术提供了极大便利性。本例患儿术前CT显示异物位于肾实质内,末端未见明显外露,故准备术中采用超声定位,然而术中发现异物末端约2.0 mm外露于肾皮质外,可

直接取出,取出后经超声检查明确异物无残留。

近年来,机器人辅助腹腔镜手术已在普通外科、泌尿外科等领域得到应用,但目前其在异物取出中的应用报道少见,仅有魏志刚团队报道了1例采用机器人辅助腹腔镜手术取出成人胰头异物的病例<sup>[1]</sup>。本例患儿安全实施了机器人辅助腹腔镜下右侧肾脏异物取出术,手术顺利,术后恢复无殊,证明了机器人辅助腹腔镜下儿童肾脏异物取出的可行性,为今后类似病例的处理提供了一种新的选择。

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