

儿童消化道磁性异物的诊疗进展

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摘要

异物摄入是儿科急诊的常见原因, 近年来, 磁铁摄入的发生率在不断增加, 磁性异物尤其是钕铁硼磁珠能够通过肠壁相互吸引, 导致肠坏死、肠梗阻、穿孔、腹膜炎和死亡, 极大增加了死亡的风险。所以, 及时诊断并取出消化道磁性异物具有非常重要的临床价值。本文旨在分析摄入磁性异物患儿的临床症状、并发症、治疗方案等因素, 对临床医生的科学决策提供帮助。

关键词

消化道, 磁性异物, 临床表现, 诊断, 治疗

Advances in the Diagnosis and Treatment of Gastrointestinal Magnetic Foreign Bodies in Children

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Abstract

Foreign body ingestion is a common reason for pediatric emergency visits. In recent years, the

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incidence of magnetic foreign body ingestion has been increasing. Magnetic foreign bodies, especially neodymium-iron-boron magnetic beads, can attract each other through the intestinal wall, leading to intestinal necrosis, intestinal obstruction, perforation, peritonitis, and even death, significantly increasing the risk of mortality. Therefore, timely diagnosis and removal of gastrointestinal magnetic foreign bodies are of great clinical importance. This article aims to analyze factors such as clinical symptoms, complications, and treatment strategies in children who have ingested magnetic foreign bodies, in order to assist clinicians in making scientific decisions.

Keywords

Gastrointestinal, Magnetic Foreign Bodies, Clinical Manifestations, Diagnosis, Treatment

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1. 引言

儿童意外摄入异物是儿科临床常见的急症之一,其中磁性异物因在玩具、日用品中的广泛应用,其误吞发病率呈显著上升趋势[1]-[4]。QuadriSEPS 集团数据进一步显示,2016~2020 年间多院内此类病例数激增达五倍,且其中 42% 的患者最终需接受手术干预[5]。这一趋势不仅反映了磁性异物对儿童健康的威胁日益严峻,更凸显了临床对规范化诊疗方案的迫切需求。本综述系统阐述了儿童磁性异物的临床表现特征、诊断要点、治疗策略等,旨在提高临床医师科学决策能力。

2. 磁性异物及其发病机制

消化道磁性异物(尤其是误吞多枚、分次吞入)的危害性主要源于其强磁性引发的肠壁机械性损伤及相关病理改变[1]。尽管大多数单枚磁体可随消化道蠕动自然排出无明显症状[6];但多枚磁体会因磁性相吸而相互贴合,导致肠壁被持续压迫,局部血供中断,引起消化道穿孔、肠梗阻、出血、腹膜炎及肠痿等,甚至导致感染性休克危及生命[7][8]。部分病例因早期临床症状隐匿,从而导致诊疗延误。延误治疗可引发消化道多发穿孔[9],长期未处理(如误吞超过 1 个月)更会导致肠管间内瘘形成[10],显著增加后续治疗复杂性与风险。

3. 临床表现

误吞磁性异物后,患者可能在早期没有任何症状或症状轻微[11]。若单个异物滞留于口咽部或食管,常表现为咽喉疼痛、流涎、吞咽困难及异物感[12][13];若滞留于胃内,大多无症状,少部分患儿可出现上腹不适、食欲减退或呕吐[14][15]。若多个磁性异物滞留于胃肠道内相互吸引,则可能使得肠管受压、缺血坏死、消化道穿孔,导致患儿出现肠梗阻、腹膜炎等并发症[16]-[18]。肠梗阻患儿常表现为呕吐、腹胀、腹痛及停止排气排便,腹膜炎则表现为腹部压痛、反跳痛及腹肌紧张等腹膜刺激征[19][20]。

消化道磁性异物还可导致患儿出现发热及精神萎靡等全身症状[21]。磁性异物在消化道内停留时间过长还可导致消化道粘膜糜烂、出血、溃疡等病变,临床表现为呕血、黑便等症状。异物游离至腹腔、胸腔还可能伤及重要脏器,引起急腹症和脓毒性休克,严重者可危及生命[22][23]。

4. 诊断

消化道磁性异物的诊断主要依赖病史、临床症状及辅助检查,获取详细完整的病史对诊断和治疗至

关重要, 由于婴幼儿难以准确描述其病史, 因此诊断常基于临床表现和影像学检查[13] [24]。

腹部 X 线是常用检查方法, 可显示异物位置和数量, 但可能漏诊多磁铁或混淆误食金属物体[25] [26], 多部位倾斜角度方位的 X 光片可能有助于辨别多个物体或金属磁体相互作用。与 X 线摄影相比, CT 有助于更详细地描绘异物的具体位置, 并提高检测异物相关并发症的敏感性[27]。因此, CT 被认为是检测异物以及评估并发症风险的良好方法, 若存在持续的临床担忧及怀疑合并并发症, 可以考虑 CT 进一步评估[28]。然而, 由于 CT 具有更大的辐射危害并且比 X 线平片更昂贵等原因, X 线平片常作为消化道异物首要检查及随访检查的更好选择[29]。超声是儿科人群的理想成像方式, 因其实时显示、零电离辐射暴露和实惠的价格而在临床上得到广泛应用, 但它在检测小异物方面的灵敏度和特异性较差, 较少作为消化道异物的首选检查[30]。

5. 治疗

5.1. 风险评估与分层

对于消化道磁性异物的治疗, 应根据异物的位置、大小、数量以及患者的具体情况等选择合适的处理方式[29]。

研究表明, 若磁体滞留于食管或十二指肠及以上部位, 24 小时内可尝试胃镜取出; 若磁体已进入十二指肠降部部位若远端, 胃镜无法完全取出, 需密切监测异物动态变化, 一旦出现腹痛加重、肠梗阻或穿孔体征, 应及时手术干预[24] [31] [32]。

一般情况下, 直径 $< 2.5\text{ cm}$ 的异物能通过幽门, 长度 $< 6.0\text{ cm}$ 的异物能通过十二指肠。对于单颗磁性异物而言, 若患儿无症状且磁性异物直径 < 2.5 厘米、长度 < 6 厘米, 可定期行 X 线检查随访, 若 4 周内未排出则予取出, 若患儿出现症状或异物大小超过上述标准, 则应及时取出异物[33]。对于多颗磁性异物而言, 若滞留于食管或胃内, 应在 24 小时内行内镜取出[34] [35]; 误食时间 < 4 小时且无症状者, 优先尝试胃镜取出; 若超过 4 小时或伴腹痛、腹胀、呕吐等症状, 则需紧急手术[36]。值得注意的是, 若多颗磁体相连接且均位于胃内, 总体积未阻塞肠道, 无症状患儿可短期观察(≤ 8 小时) [37]。但因腹腔环境复杂, 肠内容物或局部炎症可能阻碍磁体排出, 故即使无症状者仍需视为潜在手术对象, 密切监测并谨慎制定方案[38]。

5.2. 保守治疗

保守治疗主要适用于低风险、可能自行排出的病例, 核心为密切观察与等待自然排出。对于单颗磁性异物而言, 若患儿无症状且磁性异物直径 < 2.5 厘米、长度 < 6 厘米, 可定期行 X 线检查随访, 若 4 周内未排出则转为内镜或手术取出; 若多颗磁体相连接且均位于胃内, 总体积未阻塞肠道, 无症状患儿可短期观察(≤ 8 小时)。但均需警惕腹腔环境对磁体排出的阻碍, 观察期间需动态评估症状及影像学变化。

5.3. 内镜治疗

对于可能造成消化道黏膜损伤或不能及时自行排出体外的异物, 内窥镜是其首选治疗方法[39]。消化内镜如胃镜等具有易操作、损伤小、成功率高、并发症极低等优点, 已在磁性异物的治疗中广泛应用[40] [41]。当使用消化内镜取出磁性异物时, 需选择适当的内镜和工具以预防并发症的发生[42] [43]。传统异物钳(如鼠齿钳、鳄口钳、三爪钳)、网篮类器械(Dormia 网篮、取物网兜)及息肉圈套器虽为通用工具[44], 但存在反复抓取导致黏膜损伤的风险。针对磁性异物的特殊性, 近年研发的新型器械显著提升了操作效能。磁性鼻笼头作为专为金属异物设计的工具, 通过磁力吸附原理实现多枚磁珠同步抓取, 其操作简便性不仅缩短了手术时间, 更具“过载保护特性”(受力过大自动脱落), 重力辅助使异物贴附食管壁, 减少

操作接触点并降低穿孔风险[45]。球囊扩张联合磁技术通过扩大视野,将深部异物牵引至可视区域,既减少盲目操作又缩短手术时间[46]。麻醉喉镜与胃镜协同定位可提升上消化道复杂解剖区的操作精度[47]。透明帽辅助技术则通过物理屏障减少黏膜损伤,同时改善视野清晰度[48]。这些创新技术通过降低操作复杂性、减少器械与组织的直接接触,实现了并发症风险的有效控制,也进一步提高了复杂病例的处理效率。

5.4. 外科治疗

当内镜无法取出异物或术中出现穿孔、梗阻等并发症时,需及时转为手术治疗。手术方式需结合医疗条件及术者经验选择,主要包括开放手术与腹腔镜手术[49]。近年来,多枚小磁铁误吞比例上升,需手术干预的病例也有所增加[50]。Brown 等人[41]发现多颗磁性异物的摄入可能会引起患儿嵌顿部位粘膜的快速坏死及穿孔,需积极干预。腹腔镜手术凭借创伤小、恢复快、并发症少等优势[51]-[53],已成为经验丰富医疗团队的首选方案[54][55]。腹腔镜手术缩短住院时间及降低并发症发生率的效果已被多项研究证实[56]-[58]。然而,开放手术在探查隐匿性穿孔或复杂粘连时更具优势[59],因此需根据患儿病情进行个体化决策,以平衡疗效与安全性,以最大限度降低风险。

在由儿童磁性异物引发的消化道损伤中,消化道穿孔是最具威胁性的并发症之一。早期预防穿孔发生、精准识别高风险病例,是改善预后的核心环节。临床研究已为穿孔风险的早期预警提供了关键循证依据:一方面,血清炎症标志物可作为可靠的预测工具——C-反应蛋白在消化道多发性穿孔患儿中显著升高,可作为穿孔发生的“预警信号”[60];降钙素原则凭借快速、敏感的特性,成为识别上/下消化道穿孔(GIP)的高特异性指标[61]。另一方面,临床症状也是风险评估的重要线索——有症状患儿因异物刺激或已出现局部损伤,其穿孔风险显著高于无症状者[29][62]。基于此,临床需对有症状患儿或影像学提示肠壁受压、缺血的病例保持高度警惕,尽早检测 CRP、PCT 等生化指标,结合临床表现动态评估穿孔风险,为及时干预争取黄金时间。

6. 总结

儿童消化道磁性异物发病率逐年上升的趋势,其核心危害在于其强磁性引发的肠壁压迫与缺血坏死。目前,消化道磁性异物的治疗已形成以风险评估为基础,保守观察、内镜治疗为主,外科干预为辅的体系。临床医生可根据异物的位置、大小、数量、血清炎症标志物以及患者症状等综合判断,精准识别高风险病例,合理处理消化道磁性异物,改善预后。然而,对于无症状多枚磁性异物的处理时机而言,胃内短期观察的安全性是否充分,如何结合临床症状与影像学动态评估相关并发症的风险还需更全面的探索,对于不同治疗方案的患儿,其远期消化道功能(如蠕动功能、瘢痕形成)是否受影响缺乏大样本长期随访研究。因此,我们需进一步开展多中心前瞻性研究,明确无症状多枚磁体的最佳观察周期及干预处理,建立长期随访队列,评估不同治疗方式对患儿生长发育及消化道功能的远期影响。

7. 预防与公共卫生

由于婴幼儿和学龄前儿童对危险性的认识不足,他们常易误吞各种物体,我们应加强对儿童的教育,提高他们对危险物品的认识,并加强对他们的监管,以防止误吞异物的发生;同时,进一步加强对看护人消化道磁性异物相关知识的宣传,提高看护人的防范意识。

此外,2012 年间美国消费者产品安全委员会(CPSC)发布了召回令和有关大功率磁铁装置的禁令文件,在该禁令发布后,儿童磁铁摄入的发生率大大减少[63]。因此,国家应制定和完善与儿童安全相关的法律法规,加强对儿童玩具、用品的监管,防止存在安全隐患的儿童玩具类产品流入市场;通过各种渠道提高公众对儿童消化道异物危害的认识,鼓励大家共同关注儿童安全问题,进一步减少儿童消化道磁性异

物摄入的风险。

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