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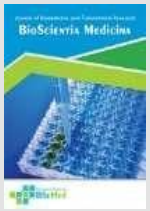

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Conservative versus Interventional Management of Ingested Straight Pins in Adolescent Females: A Retrospective Case Series Illustrating Guideline-Based Decision-Making

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A B S T R A C T

Background: The ingestion of sharp foreign bodies (FBs) in adolescents presents a critical management dilemma, balancing conservative observation against the risk of gastrointestinal perforation. In certain cultural contexts, the accidental ingestion of straight pins used for hijabs creates a unique patient cohort. This study aims to illustrate the practical, guideline-based application of divergent management strategies in these specific clinical scenarios. **Methods:** We conducted a retrospective case series of five female adolescents, aged 13 to 15 years, managed at a single tertiary center for accidental straight pin ingestion. Data on clinical presentation, radiological findings, management strategy (conservative versus endoscopic), and outcomes were extracted and analyzed. Management decisions were dictated by established international guidelines. **Results:** Three asymptomatic patients (60%) with pins located distal to the duodenum were managed conservatively and experienced spontaneous passage within 2-4 days. Two patients (40%) required therapeutic endoscopy. One underwent emergent removal for a proximally located pin causing respiratory symptoms. The other, despite being asymptomatic, underwent urgent intervention due to the development of a radiological "sentinel loop" and rising inflammatory markers, which revealed an impacted duodenal pin. No complications occurred in any patient. **Conclusion:** This series demonstrates that while active surveillance is a safe strategy for asymptomatic patients with distally located sharp FBs, clinical silence does not preclude impending complications. Subtle radiological findings, such as a sentinel loop, are crucial indicators that must prompt timely endoscopic intervention to prevent morbidity. The educational value lies in highlighting these critical decision-making triggers.

1. Introduction

The accidental ingestion of a foreign body (FB) is a common and compelling reason for presentation to pediatric emergency departments worldwide, with the highest incidence occurring in children under the age of three.[1] The vast majority of these incidents, estimated at 80-90%, involve blunt, small, or otherwise innocuous objects that successfully navigate the gastrointestinal (GI) tract and are expelled without clinical sequelae.[2] In such cases,

management is straightforward, typically involving parental reassurance and watchful waiting for spontaneous passage.

However, the clinical landscape transforms dramatically when the ingested object is sharp, pointed, or elongated.[3] Objects such as needles, open safety pins, animal bones, and straight pins represent a high-risk category of FB ingestions and are responsible for the preponderance of serious complications. The probability of these objects failing to pass spontaneously is significantly higher, with reported rates ranging from 15% to 35%, often necessitating endoscopic or, in rare cases, surgical intervention.[4] The most feared complication associated with sharp FBs is perforation of the GI tract, an event that can lead to life-threatening conditions, including peritonitis, mediastinitis, abscess formation, hemorrhage, or fistula development.

The risk of impaction and subsequent perforation is not uniform throughout the GI tract but is concentrated at sites of physiological narrowing, acute angulation, or sphincter function.[5] These anatomical choke-points include the cricopharyngeal sphincter in the upper esophagus, the impression of the aortic arch, the pyloric sphincter, the C-shaped curvature of the duodenal sweep (particularly at the ligament of Treitz), the ileocecal valve, and occasionally the appendix. The clinical presentation following sharp FB ingestion is notoriously unreliable; while some patients present with clear and alarming symptoms such as dysphagia, odynophagia, or abdominal pain, a substantial portion may remain completely asymptomatic, even in the presence of a contained perforation.[6] This clinical silence complicates decision-making, forcing a delicate balance between the risks of an invasive procedure and the potential for a catastrophic outcome with delayed intervention.

To address this challenge, authoritative bodies including the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) have published robust, evidence-based guidelines. These guidelines are unequivocal in their recommendation for urgent (typically within 24 hours) endoscopic removal of sharp FBs located within reach of an endoscope—namely, in the esophagus, stomach, or proximal duodenum—regardless of whether the patient is symptomatic.[7] The clinical dilemma, therefore, is most pronounced when a sharp object has successfully traversed these upper GI structures and progressed beyond the ligament of Treitz into the distal small bowel.[8] For an asymptomatic patient in this scenario, the guidelines permit a strategy of "active surveillance," involving serial radiography and clinical monitoring, with intervention reserved for cases where the object fails to progress over approximately 72 hours or if symptoms develop.

Within this broader context, a specific and concerning sub-epidemic has been documented among adolescent Muslim females who accidentally ingest straight pins (known colloquially as jarum pentul) while holding them in their mouths to adjust their headscarf, or hijab.[9] This culturally specific practice results in a uniquely homogenous patient population and a predictable type of ingested FB, offering a valuable opportunity to study the natural history and management of this precise event. Our institution, a tertiary referral center, has managed several such cases, adhering strictly to established international guidelines.[10]

Therefore, the aim of this study is not to propose a new management paradigm, but to provide a detailed, retrospective, and comparative illustration of guideline-based decision-making in this unique cohort. The educational novelty of this report lies in its granular, day-by-day account of the two divergent management pathways—conservative surveillance versus urgent intervention. By meticulously documenting the clinical reasoning, radiological evolution, and ultimate outcomes of these five cases, we seek to illuminate the critical decision points that clinicians face and reinforce the application of evidence-based algorithms for this challenging clinical problem, with a particular focus on the subtle

indicators that herald the failure of conservative management.

2. Methods

This study was designed as a retrospective, descriptive case series. It was conducted at the Department of Surgery, Dr. Kariadi General Hospital, a university-affiliated, tertiary care teaching hospital located in Semarang, Indonesia. All procedures and data handling were performed in accordance with the ethical principles for medical research involving human subjects outlined in the Declaration of Helsinki. The study protocol underwent a formal review and received approval from the Institutional Review Board (IRB) of the Faculty of Medicine, Universitas Diponegoro/Dr. Kariadi General Hospital. A waiver for individual patient informed consent was granted by the IRB, citing the retrospective nature of the analysis, which involved only existing, de-identified medical records and posed no more than minimal risk to the subjects. To ensure patient privacy and confidentiality, all personal identifiers were removed from the data abstraction forms, and patient information was fully anonymized prior to analysis.

We conducted a retrospective review of the medical records of all patients who presented to our institution for foreign body ingestion between January 1st, 2024, and December 31st, 2024. The source population comprised all adolescent patients who presented to the emergency department, outpatient surgical clinics, or were admitted with a relevant diagnosis code. To minimize selection bias, a consecutive sampling method was employed, whereby every patient who met the eligibility criteria within the defined study period was included in the analysis.

Patients were included in the case series if they satisfied all of the following inclusion criteria: Age between 13 and 15 years, inclusive. This specific age range was not an a priori restriction but reflects the entirety of the identified cohort of hijab-pin ingestions that met all other criteria during the study period; no patients aged 12, or 16-18 who met the other criteria were identified and subsequently excluded; A confirmed diagnosis of accidental ingestion of a single, metallic straight pin; Radiographic evidence (plain chest and/or abdominal X-ray) confirming the presence and location of the foreign body upon initial evaluation; Availability of a complete medical record, encompassing detailed clinical notes from presentation to discharge, all laboratory results, formal radiology reports and images, procedural notes (if applicable), and follow-up data. Patients were excluded from the series based on any of the following criteria: Ingestion of other types of sharp objects (needles, safety pins) or blunt foreign bodies; ingestion of multiple foreign bodies; Patients transferred from other institutions without complete initial medical records, which would preclude a full analysis of the initial management decisions; Significantly incomplete or missing medical records that prevented a thorough reconstruction of the clinical course and outcomes.

A standardized data abstraction form was meticulously designed and utilized to extract all relevant information from the hospital's electronic health record system and archived paper-based charts, ensuring consistency and completeness of data collection across all cases. The following variables were systematically collected for each patient: Demographics: Age (in years) and Gender; Clinical Data: Time from ingestion to clinical presentation (in hours); a detailed account of presenting symptoms, including dysphagia, dyspnea, odynophagia, chest pain, abdominal pain, nausea, and vomiting; a comprehensive summary of physical examination findings at presentation and during serial assessments, including vital signs (blood pressure, heart rate, respiratory rate, temperature, oxygen saturation), head, ears, eyes, nose, and throat (HEENT) examination for signs of airway compromise, cardiopulmonary assessment, and a detailed abdominal examination noting tenderness (with location and severity), guarding, rebound tenderness, and the character of bowel sounds; Laboratory Data: Complete blood count (CBC) with differential, specifically noting the total white blood cell (WBC)

count, neutrophil percentage, and band forms percentage; and C-reactive protein (CRP) levels; Imaging Data: Type and findings of all initial and follow-up radiographs. Data included the precise anatomical location of the pin (laryngopharynx, duodenum, descending colon), its orientation (vertical, horizontal, oblique), and the presence of any secondary signs of complications, such as pneumomediastinum, pneumoperitoneum, bowel obstruction, or the presence of a sentinel loop; Management Details: The specific management strategy employed (conservative or interventional). For conservative management, details included dietary instructions (high-fiber diet), the schedule for clinical and radiological follow-up, and criteria for discharge with outpatient monitoring. For interventional management, data included the type of procedure (rigid esophagoscopy, flexible esophagogastroduodenoscopy [EGD]), the time from presentation to the procedure, detailed procedural findings (including the condition of the surrounding mucosa), the extraction technique and specific device used (Magill forceps, Roth Net retriever), and any iatrogenic complications; Outcomes: The primary outcomes measured were the time to spontaneous passage of the pin (for conservatively managed cases), success of endoscopic removal, total length of hospital stay, and the occurrence of any procedure-related or observation-related complications.

For the purposes of this study and to ensure clarity in the analysis, the following operational definitions were strictly applied: Conservative Management: An initial, non-interventional strategy characterized by inpatient or outpatient observation, prescription of a high-fiber diet to increase stool bulk and promote GI motility, and a structured plan for serial clinical and/or radiological follow-up; Failure of Conservative Management: This was defined as the occurrence of any of the following clinical, radiological, or temporal triggers that prompted a shift to an interventional approach: Clinical Deterioration: The development of new or worsening symptoms such as significant abdominal pain, fever, vomiting, hematemesis, or melena; Failure of Progression: In an asymptomatic patient, the sharp FB remained fixed in the same anatomical location on serial radiographs for a period exceeding 72 hours; Radiological Warning Signs: The appearance of any radiological evidence of frank perforation (free intraperitoneal air) or signs suggestive of impending perforation, such as localized ileus (sentinel loop) or visible bowel wall thickening adjacent to the FB; Sentinel Loop: This was defined radiologically as a single, persistently dilated, gas-filled loop of small or large bowel located immediately adjacent to the foreign body. This finding, when identified and reported by a board-certified radiologist, was interpreted as an objective sign of localized inflammation or contained micro-perforation.

3. Results

During the study period, five female patients met the stringent inclusion criteria. The mean age of the cohort was 14.2 years, with a range of 13 to 15 years. In all five cases, the mechanism of injury was identical: the accidental ingestion of a straight pin that was being held in the mouth while adjusting a hijab. Following a guideline-based approach, three patients (60%) were managed successfully with a conservative strategy, while the remaining two patients (40%) required therapeutic endoscopic intervention. No patient experienced long-term complications. The key demographic, clinical, management, and outcome data for all patients are summarized in Table 1.

In the first case, a 15-year-old female presented to the emergency department (ED) two hours after accidentally swallowing a straight pin. The event occurred when she was startled while adjusting her hijab, causing a reflexive gasp and immediate sensation of a foreign body lodged in her throat. This progressed over the next hour to mild, non-exertional dyspnea and a persistent, non-productive cough, though she denied odynophagia or significant pain. On examination, her vital signs were stable and within normal limits: blood pressure 115/70 mmHg, heart rate 88 beats/min, respiratory rate 20 breaths/min, and oxygen saturation 99% on room air.

Table 1. Summary of patient demographics, clinical presentation, management, and outcomes.

Case Series Summary

Patient Demographics, Clinical Presentation, Management, and Outcomes

	Case 1	Case 2	Case 3	Case 4	Case 5
Age (years)	15	13	15	13	15
Time to Presentation	2 hrs	5 hrs	24 hrs	4 hrs	6 hrs
Symptoms	Neck discomfort, mild dyspnea	None	None	Transient scratchiness	None
Initial WBC	7,500	*Deferred*	*Deferred*	6,800	8,100
Initial CRP	<0.5	*Deferred*	*Deferred*	<0.5	<0.5
Pin Location	Laryngopharynx	Distal ileum/cecum	Transverse colon	Descending colon	Duodenum
Strategy	Emergent Endoscopy	Conservative	Conservative	Conservative	Urgent Endoscopy
Outcome	Successful removal	Spontaneous passage	Spontaneous passage	Spontaneous passage	Successful removal
Length of Stay	1 day	Outpatient	Outpatient	1 day	2 days

She appeared in mild distress, pointing to the suprasternal notch as the primary site of discomfort. Her neck was supple, and there was no evidence of subcutaneous emphysema on palpation. Her oropharynx was clear, and cardiopulmonary and abdominal examinations were unremarkable. Initial laboratory studies were drawn, showing a WBC count of 7,500 cells/μL (65% neutrophils, 0% bands) and a CRP level <0.5 mg/dL, indicating no systemic inflammatory response. Urgent anteroposterior and lateral chest X-rays were obtained, which revealed a 3 cm linear radiopaque object consistent with a straight pin located in the thoracic inlet at the vertebral level of C3-C6. Given the proximal location within the aerodigestive tract and the presence of respiratory symptoms, a diagnosis of an impacted sharp FB was made, and the decision for emergent intervention was clear and immediate. Five hours after ingestion, the patient was taken to the operating theater. Under general anesthesia with endotracheal intubation, a rigid esophagoscopy was performed. The pin was not visualized within the esophageal lumen but was found impacted transversely in the laryngopharynx. The sharp tip was embedded in the mucosa of the right aryepiglottic fold, while the head of the pin was lodged in the left piriform sinus. Using Magill forceps under direct vision, the tip was carefully dislodged, and the entire pin was extracted without causing further mucosal trauma. A subsequent flexible EGD performed on the second part of the duodenum showed no other abnormalities or signs of a second foreign body. The patient's dyspnea and cough resolved completely within hours of the procedure. She was monitored overnight, started on a clear liquid diet the next morning, which she tolerated well, and was discharged home on postoperative day one in excellent condition.

Case 2, a 13-year-old female presented to the outpatient surgical clinic five hours after swallowing a pin. She reported the event was entirely asymptomatic and only presented at her mother's insistence. Her physical examination was completely benign. Vital signs were normal, and her abdomen was soft, non-tender, with normoactive bowel sounds and no signs of peritoneal irritation. In accordance with institutional guidelines to minimize unnecessary tests in clinically stable, asymptomatic patients with a high likelihood of outpatient management, blood work was deferred. A plain standing abdominal X-ray was performed, which demonstrated a single 3 cm straight pin located in the right lower quadrant of the abdomen. Based on its position relative to the gas pattern, it was suspected to be within the distal ileum or cecum. There were no radiological signs of

perforation or bowel obstruction. Given the distal location (well past the ligament of Treitz) and the complete absence of symptoms, a conservative management plan was initiated. The patient and her mother were counseled extensively. She was discharged home with instructions for a high-fiber diet (including fruits, vegetables, and whole grains) to promote stool bulk and was instructed on meticulous stool surveillance for the pin. Clear "red flag" symptoms warranting immediate return to the ED (worsening abdominal pain, vomiting, fever, or blood in the stool) were provided in written and verbal form. A follow-up X-ray was scheduled for 48 hours later. On day three, the follow-up X-ray showed the pin had migrated distally into the pelvic cavity, consistent with a location in the sigmoid colon or rectum. On the morning of day four, the patient's mother called to report the successful passage of the intact pin in the stool. A final confirmatory X-ray showed the absence of the foreign body, and the patient was discharged from follow-up.

Case 3, a 15-year-old female, presented 24 hours after an asymptomatic pin ingestion, seeking confirmation of its location and advice on management. She had remained entirely symptom-free since the event. Her physical examination was unremarkable, with a benign abdomen. As with Case 2, her completely asymptomatic status led to the decision to defer laboratory work. An abdominal X-ray revealed the pin located within the shadow of the transverse colon, at the level of the L2 vertebra. She was managed according to the same conservative outpatient protocol as Case 2. She was advised to maintain a high-fiber diet and to inspect all stools. On the evening of day two (48 hours post-ingestion), she reported passing the pin with a bowel movement. A telephone follow-up confirmed she remained asymptomatic, and as per protocol for confirmed passage, no further imaging was deemed necessary.

Case 4, a 13-year-old female presented to the ED four hours post-ingestion. She reported an initial, transient "scratchy" sensation in her throat that resolved within minutes of the event; she was otherwise completely asymptomatic. Her physical examination was benign. Due to significant parental anxiety and their request for a "full workup," initial labs were drawn, which were normal (WBC 6,800/μL, CRP <0.5 mg/dL). An abdominal X-ray located the pin in the left upper quadrant, consistent with a location in the descending colon. Despite the distal location, lack of symptoms, and reassuring labs, the patient's parents expressed extreme anxiety and were uncomfortable with outpatient management. Therefore, she was admitted for a 24-hour period of observation. She was placed on a high-fiber diet and remained clinically well overnight. A repeat X-ray on day two showed clear distal progression of the pin to the sigmoid colon, which provided significant reassurance to the family. She was discharged with instructions for outpatient follow-up. A subsequent X-ray on day three confirmed its position in the rectum. On the morning of day four, the pin was successfully passed in her stool, confirmed by parental report.

Case 5, a 15-year-old female, presented to the ED six hours after an entirely asymptomatic pin ingestion. Her physical examination was unremarkable, with a soft, non-tender abdomen and normal bowel sounds. Initial laboratory results were within normal limits (WBC 8,100/μL with 68% neutrophils, CRP <0.5 mg/dL). The initial abdominal X-ray showed the pin located horizontally in the upper mid-abdomen at the L1-2 vertebral level, a position suspicious for the stomach or, more concerningly, the duodenum. Given the proximal location relative to the ligament of Treitz, the decision was made to admit the patient for observation with serial imaging, in line with guidelines that allow for a short observation period for FBs in the stomach/duodenum to see if they will pass the pylorus. On the morning of day two, approximately 24 hours after the initial X-ray, the patient remained clinically well. She denied any pain, her abdominal exam was still benign, and she was afebrile. However, the follow-up X-ray revealed critical changes. First, the pin had failed to progress distally. Second, its orientation had changed from horizontal to vertical, and it appeared fixed in position in the right

hemiabdomen. The consulting radiologist identified a crucial new finding: a localized, mildly dilated loop of small bowel immediately adjacent to the pin's sharp tip. This was formally interpreted as a sentinel loop—a subtle but specific sign of localized inflammation or a contained micro-perforation. Concurrently, her repeat CBC, ordered due to the concerning X-ray, showed a new leukocytosis of 11,500 cells/μL with a left shift (75% neutrophils, 10% bands). Her CRP had risen from undetectable to 1.8 mg/dL. This triad of findings—a fixed object, a new sentinel loop, and rising inflammatory markers—was deemed a clear indicator of impending perforation, thus meeting the criteria for failed conservative management despite her complete lack of symptoms. An urgent EGD was performed. The endoscope was advanced past the pylorus and into the second part of the duodenum (D2). There, the pin was identified, with its sharp tip found to be directly impacted and embedded into the duodenal mucosa. The surrounding mucosal tissue was visibly edematous and erythematous, confirming the localized inflammatory process suspected on the radiograph, although no frank perforation was seen. To ensure a safe extraction and protect the esophageal and pharyngeal mucosa from the sharp tip during removal, an overtube was placed. A Roth Net retriever was passed through the endoscope, used to grasp the pin, carefully dislodge it from the duodenal wall, and withdraw it safely through the overtube. The patient's postoperative course was uneventful. Her mild leukocytosis resolved within 24 hours. She was started on a diet the following day and was discharged home on postoperative day two without any complications.

4. Discussion

This study provides a detailed clinical narrative that vividly illustrates the two divergent, yet equally guideline-adherent, pathways in the management of ingested sharp FBs in a unique adolescent cohort. The findings from these five cases are consistent with the principle that while conservative management is frequently successful for distally located pins, a high index of suspicion and vigilant, active monitoring are paramount for identifying the subset of patients who require timely intervention to avert severe morbidity.[11] This discussion will focus on the underlying pathophysiology that dictates the behavior of sharp FBs, provide a rationale for the management decisions in the context of established guidelines, and explore the broader socio-cultural context of these events.[12]

The journey of an ingested object through the GI tract is a complex interplay between peristaltic forces, luminal diameter, and anatomical angulations (Figure 1). For a sharp, linear object like a pin, this journey is particularly perilous. Safe passage is overwhelmingly dependent on a phenomenon known as lumen-seeking peristalsis, a coordinated series of muscular contractions that not only propel the object forward but also tend to align it longitudinally within the bowel lumen, often with the blunt, heavier end leading.[13] This remarkably effective physiological mechanism explains the successful, injury-free passage observed in Cases 2, 3, and 4.

However, this propulsive mechanism can fail at specific high-risk anatomical sites, leading to fixation, impaction, and perforation.[14] Our series provides compelling clinical examples of impaction at two of these critical zones and successful navigation through others. As demonstrated in Case 1, the upper aerodigestive tract, with its cricopharyngeal sphincter and close relationship to the airway, is a common site for impaction. An impacted sharp FB in this location is a true surgical emergency. The risk of perforation into the mediastinum is high, an event associated with significant morbidity and mortality from mediastinitis.[15] The patient's dyspnea was likely multifactorial, stemming from a combination of direct mass effect on the airway structures and localized inflammation and edema in the tight confines of the thoracic inlet. The pylorus and the acute, C-shaped curve of the duodenum, particularly at the ligament of Treitz, where the bowel becomes fixed retroperitoneally, represent the next major anatomical hurdle. This was the site of failure in Case 5.

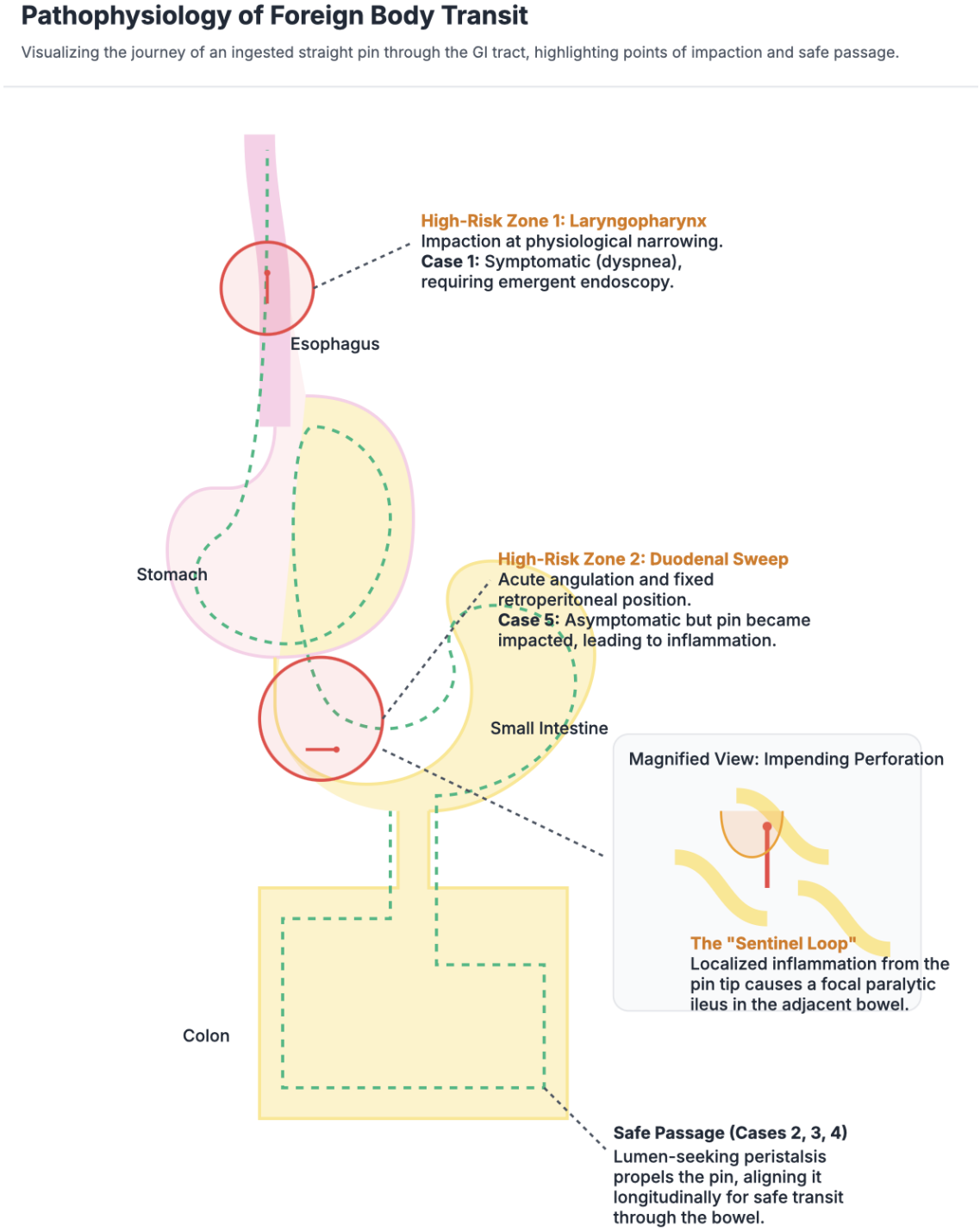

Figure 1. Pathophysiology of foreign body transit.

The pin became impacted in the second part of the duodenum, a retroperitoneal structure. Perforation here can be particularly insidious, as it may not result in pneumoperitoneum or generalized peritonitis.[16] Instead, it can lead to a retroperitoneal abscess, a more subtle and often delayed diagnosis. The pin's failure to navigate this curve exemplifies this high-risk zone. Once an object successfully passes the ligament

of Treitz, it can still become trapped at the ileocecal valve or within the tortuous and redundant sigmoid colon. The pins in Cases 2, 3, and 4 successfully navigated these final checkpoints, propelled by the bulky fecal stream of the colon, which likely helped to envelop the sharp tip and facilitate safe passage.

Case 5 provides a classic illustration of the early pathophysiology of impending perforation and serves as the most critical educational point of this series. When the sharp tip of the pin became embedded in the duodenal wall, it initiated a localized inflammatory cascade. Direct mucosal injury and pressure necrosis from the fixed tip triggered the release of pro-inflammatory mediators (cytokines, prostaglandins). This led to increased local vascular permeability, resulting in the tissue edema and erythema that were visualized endoscopically. This inflammatory response also explains the systemic reaction: the recruitment of leukocytes to the site of injury was reflected by the rising WBC count and left shift, and the hepatic synthesis of acute-phase reactants was evidenced by the elevated CRP.

This intense localized inflammation has a profound effect on adjacent bowel function, causing a focal paralytic ileus.[17] Radiographically, this manifests as a single, persistently dilated, and air-filled loop of bowel known as a sentinel loop. While a non-specific sign in some contexts, in the setting of a fixed, sharp FB, its diagnostic value is immense. The appearance of this sign in Case 5 was the critical objective indicator of an ongoing pathological process that mandated intervention. Ignoring this subtle radiological cue in favor of the patient's reassuringly asymptomatic state could have allowed the process to progress to frank perforation, retroperitoneal abscess, or fistula formation.[18] This case powerfully underscores the principle that in the management of sharp FBs, radiological evidence of pathology must often override a benign clinical examination.

The management of all five cases aligns precisely with the algorithms proposed by ESPGHAN and NASPGHAN, demonstrating the real-world application of these guidelines. Case 1 represented a clear-cut emergency. The combination of a proximal location (laryngopharynx) and respiratory symptoms presented an unacceptably high risk of airway compromise or mediastinal perforation, mandating immediate intervention. Case 5, while clinically silent, demonstrated undeniable radiological and biochemical evidence of impending complications. In both scenarios, the potential risks of continued observation (catastrophic perforation) far outweighed the minimal risks of a carefully planned endoscopic procedure. These cases exemplify the "intervene" arm of the guidelines. In cases 2-4, the pins had successfully navigated the high-risk upper GI tract and were located well past the duodenum. Once a sharp object enters the jejunum, the risk of complications decreases significantly, although it is never zero. The successful spontaneous passage in 60% of our cohort is consistent with broader literature, which reports failure-to-pass rates of 15-35% for sharp objects. Our mean time to passage of 3.3 days (range 2-4) also aligns with other pediatric series. The use of a high-fiber diet, while not proven in randomized trials, is a common practice thought to create a bulky stool that envelops the object and facilitates its safe passage. The successful outcomes in these three cases validate the "active surveillance" arm of the management guidelines for asymptomatic, distally located sharp FBs.

While other reports on hijab-pin ingestion have correctly highlighted the high overall success rate of conservative management, our series adds a critical caveat, powerfully demonstrated by Case 5, the asymptomatic patient is not always safe. This distinction reinforces that conservative management is not passive waiting. Rather, it is an active process that requires reliable patients and caregivers, clear and unambiguous instructions for return, and a structured, low-threshold plan for clinical and radiological follow-up.

It is imperative to acknowledge the unique epidemiological context of this series. All five cases resulted from the specific, habitual behavior of holding pins in the mouth while adjusting a hijab.[19] This is a

well-documented phenomenon that represents a significant and entirely preventable cause of both FB ingestion and aspiration in communities where this is a common practice. This underscores a vital public health dimension to what is otherwise a surgical problem. While clinicians must be adept at managing the consequences of these events, the most effective intervention is primary prevention.[20] There is a clear and urgent need for community-based educational and public awareness campaigns, potentially delivered through schools, community centers, and social media, aimed at young women to highlight the profound dangers of this seemingly innocuous habit.

This study has several inherent limitations that must be considered. First, as a retrospective case series, it is susceptible to information bias contingent on the quality and completeness of medical record-keeping. The noted inconsistency in obtaining baseline laboratory tests in asymptomatic patients is an example of this. Second, the very small sample size (N=5) precludes any form of statistical analysis and means the observed frequencies (60% conservative success) are not generalizable to a larger population; the absence of complications in our conservatively managed group could certainly be attributable to chance. Third, this is a single-center experience, and our specific patient flow and management pathways may not be directly applicable to all healthcare settings, particularly those with different levels of access to pediatric endoscopy. Finally, although we employed a consecutive sampling method to minimize selection bias, it remains possible that patients with more or less severe presentations were managed at other institutions and were not captured in our review.

5. Conclusion

The management of ingested straight pins in adolescents requires a nuanced, individualized approach that is guided by a careful synthesis of clinical symptoms, physical examination, and, most critically, radiological findings. This case series, while limited in size, effectively illustrates and supports the safety and efficacy of current evidence-based management algorithms. Our findings suggest that asymptomatic patients with a pin located distal to the duodenal sweep can be managed safely with a conservative strategy of a high-fiber diet and vigilant follow-up. However, this strategy demands a low threshold for reassessment. The development of any clinical symptoms or subtle radiological signs of inflammation—such as a fixed position or the formation of a sentinel loop—must be interpreted as harbingers of impending complications and should trigger prompt therapeutic endoscopy, even in a clinically silent patient. Ultimately, the unique cultural context of these cases serves as a powerful reminder that the most effective intervention is primary prevention through targeted public health education to eliminate the high-risk behavior at its source.

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