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Research Article

Very Delayed Complications of Stamey Needle Suspension: A Case Report and Review of the Literature

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Abstract

Introduction: Surgical treatment of Stress Urinary Incontinence (SUI) has evolved significantly, with needle suspension techniques like the Stamey procedure once widely used. We report a rare, delayed complication over 30 years post-Stamey and review related late outcomes involving synthetic materials.

Methods: We describe a case of a patient presenting over 30 years post-Stamey with chronic lower urinary tract symptoms and recurrent urinary tract infections. A PubMed literature search was then conducted to identify reports of late (>1 year) complications associated with synthetic materials used in the Stamey procedure. Studies involving mesh or other procedures were excluded. Extracted data included presenting symptom, complication type, diagnostic work-up, and management.

Results: The patient was found to have bladder erosion by synthetic suture material, which was removed endoscopically in-office, resolving her symptoms. The literature search identified 24 relevant cases, with time to presentation ranging from 1 to 40 years postoperatively. Presenting symptoms most commonly included pelvic or abdominal pain, urinary tract infections, stress urinary incontinence, and abnormal vaginal discharge. The most frequently reported complications were erosion of synthetic material, vesical calculi formation, and fistulae. Most cases were managed endoscopically. Delays in diagnosis were common due to vague symptoms and a lack of procedural history.

Conclusions: Late complications of the Stamey procedure can present decades after surgery and are often misdiagnosed due to their non-specific symptoms. Clinicians should remain alert to the possibility of retained foreign material in patients with a history of anti-incontinence surgery and persistent lower urinary tract symptoms.

Keywords: Bladder Neck Suspension; Late Complications; Stamey Procedure; Stress Urinary Incontinence; Synthetic Material

Introduction

Surgical treatment of Stress Urinary Incontinence (SUI) has rapidly evolved over the past century. The first effective surgical approach, described by Kelly and Dunn in 1914, involved anterior colporrhaphy with bladder neck plication and became known as the Kelly plication [1]. In 1944, Marshall, Marchetti, and Krantz introduced anterior urethropexy via direct fixation of the bladder neck and urethra to the periosteum of the symphysis pubis [2]. This technique, later known as the MMK procedure, was modified by Burch in 1961 to avoid direct bony fixation, which led to improved outcomes and became the preferred method [3]. In 1959, Armand J. Pereyra introduced the needle suspension as a less invasive alternative to retropubic urethropexy, eliminating the need for an abdominal incision. Subsequent modifications by Raz, Gittes, and Stamey further refined the approach. Stamey emphasized endoscopic visualization to ensure accurate suture placement and avoid bladder injury [2]. He also introduced the use of synthetic materials, notably a Dacron (polyethylene terephthalate) buttress, to avoid suture pull-through and maintain the elevation of the

bladder neck over time-marking one of the first uses of synthetic reinforcement in SUI surgery. Needle suspension surgery gained widespread popularity and, by1992, had become the most commonly performed surgery for SUI in the United States, with over 10,000 procedures still being performed annually by 1995 [1]. Despite their early success, needle suspensions eventually fell out of favor due to inferior long-term outcomes [4]. However, as patients who underwent these procedures continue to age, reports of delayed complications-particularly those associated with retained synthetic materials—have emerged. Here, we report a case of a female patient who underwent a Stamey needle suspension and presented with a delayed complication of bladder erosion more than 30 years later. A literature review was then performed to identify and characterize the reported late complications associated with the Stamey procedure to date, with particular focus on urological outcomes related to the use of synthetic materials other than mesh. In doing so, we aim to highlight a clinical pearl for providers of patients presenting with Lower Urinary Tract Symptoms (LUTS) and a remote history of surgery for SUI.

Case Report

A 69-year-old female presented to our institution with an approximately 8-month history of intermittent sharp lower abdominal pain. She also complained of irritative voiding symptoms and her urinalysis was significant for microscopic hematuria. She had previously undergone an unknown 'bladder tacking' surgery in the early 1990s. Additional significant surgical history included a total abdominal hysterectomy in 1994, a sacrospinous ligament fixation for Pelvic Organ Prolapse (POP) in 2018, followed by a repeat sacrospinous ligament fixation for recurrent POP in 2019, and finally a laparoscopic sacrocolpopexy for a second recurrence of her POP. Cystoscopy performed at the time of her 2022 surgery was reportedly normal. A contrast Computed Tomography (CT) scan of the abdomen and pelvis was obtained which showed an enhancing mass involving the anterior aspect of the urinary bladder and was read as either a primary urinary bladder neoplastic process or lesion associated with the urachal ligament (Figure 1).

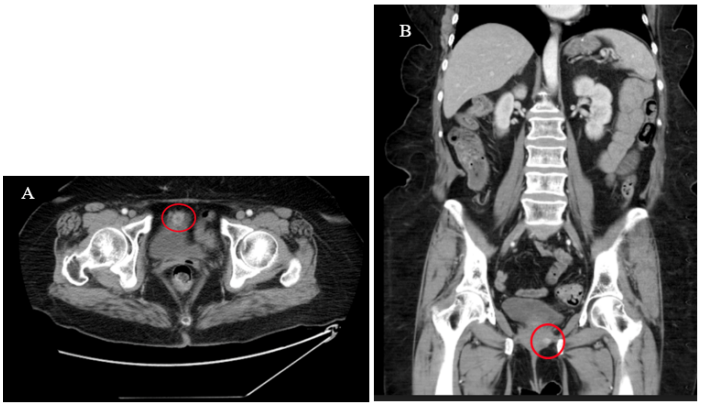

Figure 1: Axial (A) and coronal (B) contrast-enhanced CT images of the abdomen and pelvis demonstrating an enhancing mass along the anterior aspect of the urinary bladder.

Following the CT scan, the patient underwent cystoscopy both with her urogynecologist and her urologist showing a white foreign body on the anterior wall of the bladder measuring 1.5-2 cm in size with overlying stone and granulation tissue. She was referred to our institution for a second opinion. Office cystoscopy was performed with 70-degree lens noting erosion and hyperemia in the right upper part of the bladder without active perforation. A foreign object was seen free floating in the bladder lumen and removed with a grasper (Figure 2).

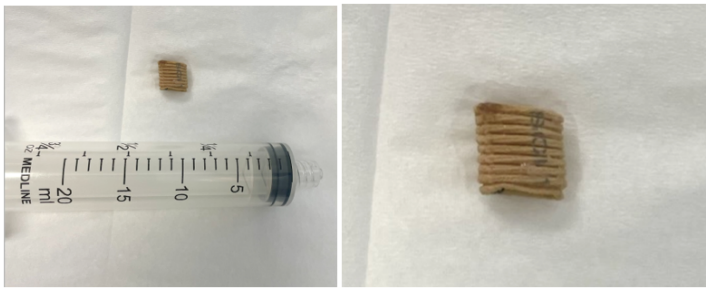

Figure 2: Foreign body removed with grasper during in-office cystoscopy.

A CT cystogram was obtained at 4 weeks, which confirmed an intact bladder wall without perforation (Figure 3). The patient's lower urinary tract symptoms were resolved upon her follow-up.

Figure 3: CT cystogram obtained at 4 weeks postoperatively demonstrating an intact bladder wall without evidence of perforation.

Methods

A literature search was conducted in PubMed with the assistance of a medical librarian to identify studies reporting delayed complications associated with the Stamey procedure. Search terms

included combinations of keywords and MeSH terms related to the Stamey procedure, long-term or delayed complications, relevant anatomic sites (e.g., bladder, urethra, periurethral or paravaginal tissues), and types of synthetic materials (e.g., sutures, bolsters) (Table 1). Articles were included if they described complications presenting one year or more after the original surgery and specifically involved synthetic materials used in the Stamey procedure, particularly those affecting urological structures. Exclusion criteria included studies focused on mesh-related complications, other surgical procedures (e.g., Marshall-Marchetti-Krantz, Raz, or Pereyra), unspecified time to presentation, or inclusion of male participants. Data were independently extracted from each eligible study, including symptomatology, time to presentation, diagnostic evaluation, type of complication, and management approach.

PubMed (NCBI)	(Stamey[tiab] OR "needle suspension"[tiab] OR "neck suspension"[tiab])
[3/20/2025]	AND
[86 records returned]	("Postoperative Complications"[mesh] OR "adverse effects"[sh] OR "Long Term Adverse Effects"[Mesh] OR adverse effect*[tiab] OR adverse event*[tiab] OR adverse outcome*[tiab] OR complication*[tiab] OR exposure[tiab] OR erosion[tiab] OR perforation*[tiab] OR obstruction*[tiab] OR fistula*[tiab])
	AND
	("Urinary Bladder"[Mesh] OR "Urethra"[Mesh] OR bladder[tiab] OR urethra[tiab] OR lower urinary[tiab] OR paravagina*[tiab] OR periurethral[tiab] OR vagina*[tiab] OR vesical[tiab] OR vesicula*[tiab])
	AND
	(foreign bod*[tiab] OR foreign material*[tiab] OR suture*[tiab] OR bolster*[tiab] OR buttress[tiab] OR tack*[tiab] OR Dacron[tiab] OR synthetic material*[tiab] OR silicone[tiab])

Table 1: Database Searches.

Results

The initial search yielded 86 articles, of which 15 met the inclusion and exclusion criteria and were included in the review. Among these, there were nine case reports and six case series for a total of 24 included cases (Table 2). Complications following the Stamey procedure were reported to occur anywhere from 1 to 40 years postoperatively in case reports, whereas the case series documented complications within a range of 1 to 12 years. The majority of patients presented between 1 and 5 years after surgery (Figure 4). The symptoms with which patients presented varied widely, including LUTS, dysuria, hematuria, pelvic pain, abdominal pain, SUI, and abnormal vaginal discharge (Figure 5). Five cases discussed the formation of vesical calculi,[5-8]. and another 3 described the development of fistulas (Figure 6) [5,9,10]. Erosion was the most commonly reported complication, noted in 13 cases [8,10-16]. Suture migration was discussed in 3 reports [13,14,17]. while 5 articles highlighted a general foreign body reaction [8,14,16-18]. Complications were most commonly managed via endoscopic removal of the buttress and sutures, with additional cases treated using open, laparoscopic, or transvaginal approaches (Figure 7).

Journal	Author (Year)	PMID	Article type	Symptom(s)	Time to presentation	Synthetic material	Diagnostic testing	Complication(s)	Management
BMJ Case Reports	Salfity et al. (2021)	**34020989**	Case report	Recurrent UTIs, abdominal pain, dysuria, SUI	40 years	Dacron buttress	CT, flexible cystoscopy, MRI	Bladder erosion, stone formation around foreign material	Cystoscopic removal of foreign material, Holmium laser
BMJ Case Reports	O'Callaghan et al. (2014)	**25239995**	Case report	Recurrent urinary sepsis, passage of air and faeculent material per-urethra	20 years	Suture	CT, flexible cystoscopy, diagnostic laparoscopy	Suture attached to calculi in bladder, enterovesical fistula	Litholapaxy, laparoscopic repair and suture removal
Obstetrics & Gynecology	Treszezamsky et al. (2012)	**22270428**	Case report	Abdominal and pelvic pain, recurrent abnormal vaginal discharge	22 years	Dacron buttress	CT	Bladder erosion, suprapubic abscess, and vaginal fistula formation	IV antibiotics, surgical abscess drainage and debridement of necrotizing subcutaneous tissue
Int Urol Nephrol.	Gregorakis et al. (2006)	**16868695**	Case report	Pelvic pain, bladder irritative symptoms	19 years	Suture and buttress	Cystoscopy	Bladder erosion by nylon suture, inflamed edematous mucosa	Cystoscopic removal of suture and Dacron buttress
Int Urogynecol J Pelvic Floor Dysfunct	Smith & Rovner (2006)	15965575	Case series (1)	Vaginal discharge, LUTS, recurrent SUI	12 years	Bolster	VUD, KUB, cystoscopy	Vaginal sinus tract	Vaginal dissection, bolster and suture removal
			-2	Vaginal discharge, pelvic pain, pyuria	11 years	Bolster	CT, cystoscopy, VUD	Vaginal sinus tract	Transvaginal exploration and bolster removal, placement of autologous pubovaginal sling
			-3	UTI, pelvic pain, LUTS	9 years	Bolster	MRI, VUD, cystoscopy	Bladder erosion by	Endoscopic removal of calcified shell, transvaginal exploration, removal of bolster, and bladder wall repair, placement of autologous pubovaginal sling
			-4	UTI, LUTS, recurrent SUI	11 years	Bolster	VUD, cystoscopy	Periurethral inflammation secondary to bolster	Urethral dissection, removal of bolster, and placement of autologous pubovaginal sling
Obstet Gynecol.	Giles and Davila (2005)	**15863578**	Case report	Vaginal discharge, abdominal draining sinus, SUI	18 years	Synthetic material	Fistulogram	Vagino-abdominal fistula, abscess around synthetic material	Surgical excision of abscess and track and open removal of suture and bolster
Hinyokika Kiyo	Komai et al. (2004)	**15148775**	Case report	Voiding pain in lower abdomen	16 years	Stamey cuff	Not reported.	Vesical calculi with Stamey cuff	Transurethral cystolitholapaxy, open cystotomy cuff removal
Int Urol Nephrol.	Athanasopoulos et al. (2002)	**12549629**	Case series (1)	Recurrent UTIs, pelvic pain	18 months	Suture and bolster	US, bladder scan, KUB, cystoscopy	Bladder erosion of calcified foreign body	Attempted but unsuccessful endoscopic litholapaxy, foreign body removal via endoscopic knife
			-2	Recurrent UTIs, pelvic pain	14 months	Suture and bolster	Bladder US, KUB, cystoscopy	Bladder erosion by calcified nylon suture	Endoscopic suture and bolster removal
Int Urol Nephrol.	Nabi et al. (2001)	**12092654**	Case report	Abdominal pain, dysuria	3 years	Suture and pledget	US, X-ray, CT, cystoscopy	Suture and pledget migration leading to foreign body granuloma	Cystoscopic resection of inflammatory tissue and removal of foreign body
Int Urogynecol J Pelvic Floor Dysfunct.	Dwyer et al. (1999)	**10207762**	Case series (1)	Recurrent SUI, UTI, pelvic pain	20 months	Suture and cuff	Cystoscopy	Bladder erosion of suture, edematous inflamed bladder mucosa	Cystoscopic removal of suture and cuff
			-2	Recurrent SUI	2 years	Suture	Cystoscopy	Bladder erosion of suture	Cystoscopic removal of suture
			-3	Recurrent SUI, voiding pain	5 years	Suture	Cystoscopy	Bladder erosion of suture	Cystoscopic removal of suture
			-4	Pelvic pain	1 year	Suture	US, cystoscopy	Bladder erosion of suture	Cystoscopic removal of suture
Int Urogynecol J Pelvic Floor Dysfunct.	Biyani and Upsdell (1998)	**9849764**	Case report	Dragging sensation over left iliac fossa and groin	7 years	Suture and bolster	US, cystoscopy	Calcified cuff attached to suture in bladder wall	Cystolithopaxy and endoscopic removal of cuff
Br J Urol.	Weiss and Cohen (1992)	**1308659**	Case report	Dysuria, hematuria	4 years	Suture and buttress	IV urogram, cystoscopy	Bladder erosion of Dacron buttress and nylon suture	Endoscopic resection of buttress and stitch

UTI, urinary tract infection; SUI, stress urinary incontinence; LUTS, lower urinary tract symptoms; CT, computed tomography; MRI, magnetic resonance imaging; US, ultrasound; IV, intravenous; VUD, videourodynamics

*This article did not provide individual case-level data and was therefore excluded from quantitative analyses.

Table 2: A Summary of the Existing Literature Relating to Delayed Complications of the Stamey Procedure.

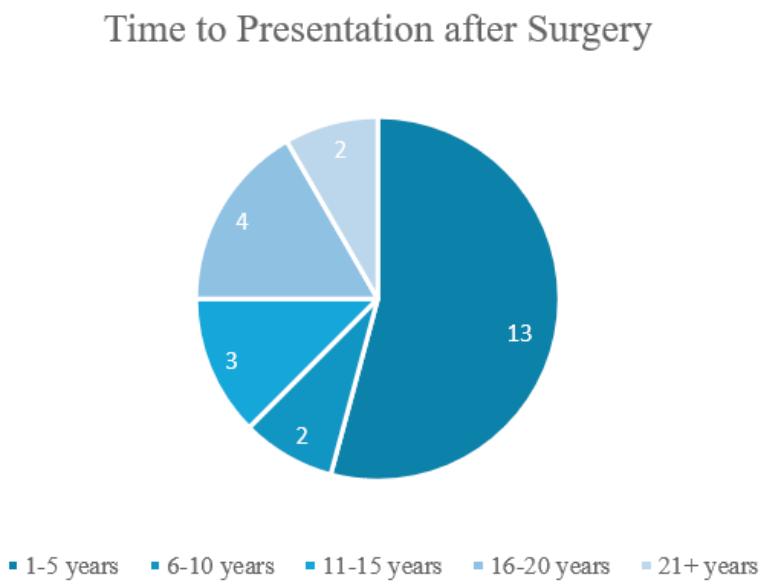

Figure 4: Time to presentation following the Stamey procedure. Among 24 total cases, 13 (54%) presented within 1–5 years postoperatively; 2 cases (8%) presented at 6–10 years; 3 cases (12%) at 11–15 years; 4 cases (17%) at 16–20 years; and 2 cases (8%) presented more than 20 years postoperatively.

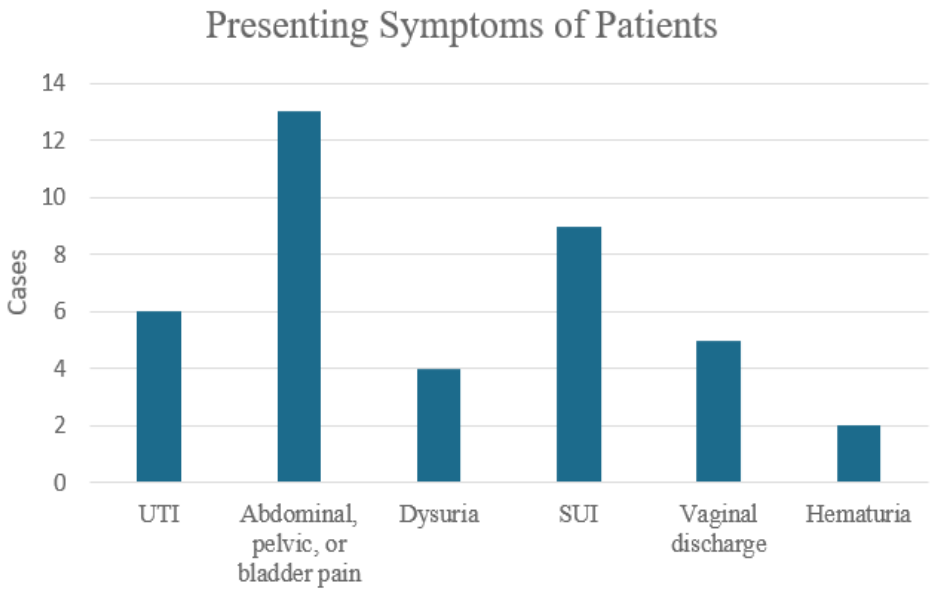

Figure 5: Reported postoperative symptoms following the Stamey procedure. The most commonly reported symptom was abdominal, pelvic, or bladder pain (13), followed by Stress Urinary Incontinence (SUI, 9), Urinary Tract Infection (UTI, 6), vaginal discharge (5), dysuria (4), and hematuria (2).

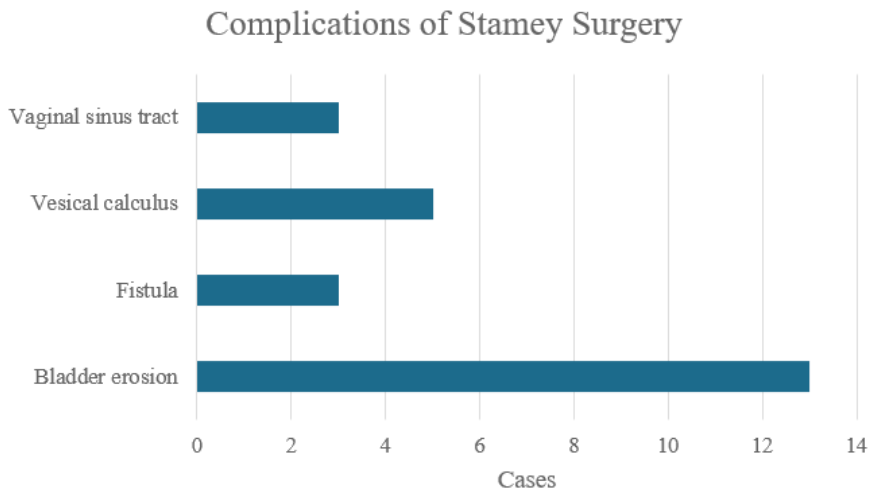

Figure 6: Reported complications following the Stamey procedure. Bladder erosion was the most frequently reported complication (13), followed by vesical calculus (5). Fistula formation and vaginal sinus tract were each reported in 3 patients.

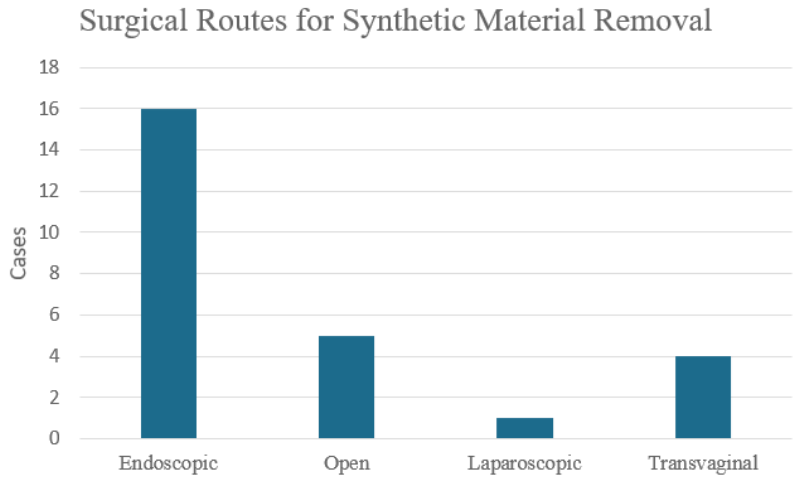

Figure 7: Surgical approaches utilized for suture or buttress removal following the Stamey procedure. Endoscopic removal was the most frequently employed method (16), followed by open (5), transvaginal (4), and laparoscopic approaches (1).

Discussion

Our case report highlights a very late-presenting complication of the Stamey procedure, an antiquated anti-incontinence surgery utilizing synthetic material such as the Dacron buttress and nylon suture. This narrative review complements our findings by compiling published literature on similar delayed complications. Our literature search revealed that the time to onset of such complications can vary widely, with the earliest reported complication presenting 14 months postoperatively and the latest presenting 40 years postoperatively. This underscores the unpredictable latency with which such complications can arise, and the value of a detailed surgical history in patients presenting with otherwise unexplained LUTS. The delayed complications associated with the Stamey procedure fall into several consistent categories: erosion, calculi formation, and fistulae. Intravesical erosion of synthetic materials was the most frequently reported complication, as was seen in our patient. Patients typically presented with recurrent UTIs, hematuria, dysuria, and/or pelvic pain. Cystoscopic evaluation remains the gold standard for diagnosis; nonetheless, it is important to recognize that a negative cystoscopy does not definitively exclude the presence of a migrated or infected bolster within the bladder or vaginal wall or adjacent pelvic soft tissues [16]. In these cases, imaging modalities like Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) may be used as an adjunctive method of evaluation for unexplained and vague pelvic or urinary symptoms. In our case and others, CT imaging was utilized as an initial diagnostic tool to evaluate vague or chronic irritative bladder symptoms, which then led to definitive diagnosis via cystoscopy.

Calculus formation was another commonly reported delayed complication of the Stamey procedure. As Komai et al. noted, the presence of foreign bodies in the bladder can serve as a nidus for stone formation, also exemplified by the overlying stone and granulation tissue formation on the Dacron buttress in our patient [7]. This is consistent with known risks of encrustation on foreign material in the urinary tract [19,20]. One proposed mechanism of calculus formation is via infection or urinary obstruction, which triggers crystals to form and accumulate on a foreign object, leading to a supersaturated environment in the bladder [21]. This allows crystals to cluster together, grow over time, and eventually develop into a calculus. Similarly, fistula formation in these cases is consistent with established mechanisms of chronic inflammation from non-absorbable implants leading to gradual extrusion into nearby organs [22]. A prospective study with long-term follow-up of 66 patients undergoing the Stamey procedure identified fistula formation as the most frequent complication, occurring in 10 patients (15.2%) at a mean of 15.3 months post-operatively (range: 2-36 months) [23]. The authors attributed this outcome to the proximity of the operative field to the anus and the suture material utilized.

Though rare, suprapubic abscesses and enterovesical fistulas were also reported in our review, reinforcing the fact that complications from permanent materials may involve multi-organ systems and present insidiously [4,9]. These patterns mirror those seen with modern synthetic slings and mesh, where erosion and infection remain well-described long-term risks. Several hypotheses have pointed to the possible mechanism behind the delayed presentation of synthetic material-related complications; however, they remain somewhat theoretical. One explanation is a delayed Foreign Body Response (FBR), a chronic inflammatory process that results in adhesion of synthetic material to surrounding structures, increasing the risk of gradual tissue erosion and perforation [13,14]. Multiple preclinical and clinical studies have demonstrated that synthetic materials, such as polypropylene and Dacron, elicit a persistent FBR, characterized histologically by the presence of macrophages, multinucleated giant cells, dense connective tissue deposition, and progressive fibrosis adjacent to the implanted material [24,25]. An alternative explanation for delayed synthetic material migration is the excessive tension placed on sutures at the time of the initial surgery, resulting in chronic ischemia and progressive tissue necrosis that predisposes to late-stage erosion [13,14]. Management across the reviewed cases was consistently surgical, with nearly all patients requiring some form of intervention to remove synthetic material or address resulting complications.

Common approaches included transurethral or open cystolitholapaxy for bladder stones, cystoscopic or open removal of eroded sutures or buttresses, and in more complex cases, laparoscopic or open fistula repair. In rare cases, the bladder wall was surgically repaired, likely in the setting of large defects [16]. In contrast, our case was managed using a minimally invasive approach through in-office cystoscopy, avoiding the need for general anesthesia. Additionally, there was no visible bladder wall defect, therefore a follow-up cystogram 4 weeks after cystoscopic foreign body removal was performed and showed that the bladder wall had healed spontaneously. This suggests that surgical bladder repair may not be necessary in all cases, especially those with small residual defects and successful removal of foreign material. A recurring theme across the reviewed cases was a significant delay between symptom onset and definitive diagnosis. In many cases, symptoms were vague or misattributed, delaying appropriate diagnosis and management. For instance, LUTS were most often attributed to recurrent UTIs, and despite appropriate antibiotic therapy, infection and associated symptoms were resistant to treatment. Other common but confusable presenting symptoms included pelvic pain and abnormal vaginal discharge that were initially managed as isolated or unrelated issues. In many instances, the true etiology was only uncovered after imaging or cystoscopy revealed erosion, encrustation, or fistula formation related to the original Stamey procedure. In addition, while some patients presented a few years after surgery, a significant proportion did not present until several decades later, sometimes

not recalling which specific anti-incontinence surgery they had undergone. In our presented case, the patient recalled a 'bladder tacking' surgery many decades prior but was unsure of its name or details. Diagnostic delays were therefore compounded by the **long latency period** and **unfamiliarity with the procedure itself,** especially when the original surgery was performed decades earlier and not well-documented in current medical records. Clinicians unfamiliar with historical anti-incontinence procedures may not consider a remote Stamey procedure as a potential source of LUTS unresponsive to the usual diagnostic and treatment algorithm.

This highlights the need for a **high index of suspicion** in patients with unexplained pelvic or urinary tract symptoms—particularly when they are of an age where prior anti-incontinence surgeries may have involved antiquated techniques or materials. These factors, in conjunction with the rarity of these complications as demonstrated by most relevant literature being case reports, emphasize the profound diagnostic challenge in identifying the true cause of these patients' symptoms. A systems-level challenge identified by this review is the absence of a standardized framework to categorize very late surgical complications, particularly those occurring more than a decade after the initial procedure. Several cases report "delayed," "late," or "long-term" complications of the Stamey procedure, however these terms are not precisely defined to specify the time parameters that constitute a late, as opposed to early, complication. While the International Continence Society (ICS) and International Urogynecology Association (IUGA) have established a classification system for complications related to pelvic floor implants, the temporal component of this system stops at T4 (>12 months postoperatively) [26]. As such, the system fails to capture events occurring 10, 20, or even 40 years post-operatively, as documented in several of the included reports.

This limitation has implications for both clinical recognition and data reporting. Without a consistent category for "very late" complications, these events may be underreported, misclassified, or overlooked in outcomes research. Given the increasing life expectancy of patients and the continued use of synthetic materials in pelvic surgery, there may be a need to revisit existing classification systems to include very delayed presentations to more accurately capture true complication rates of such procedures. We propose defining very late complications as those occurring greater than 5 years postoperatively.This review is inherently limited by its reliance on **case reports and small case series**, which are subject to publication bias and lack standardized reporting. Therefore, the true incidence and prevalence of late complications following the Stamey procedure remain unknown. Additionally, because most reports lacked detailed surgical records or long-term follow-up, it is unclear whether patient-specific factors (e.g., comorbidities, prior pelvic surgeries, or technique variations) contributed to the delayed presentations, and whether the approaches to management were optimal. Despite these limitations, this review highlights the need for thorough history-taking and knowledge of anti-incontinence procedures of the past.

Conclusion

Our case highlights a very late complication of the Stamey procedure and demonstrates successful management using a minimally invasive approach. To our knowledge, this is the first literature review focused specifically on delayed complications of the Stamey technique. Although rare, clinicians should remain aware of historical pelvic procedures and their potential for late-presenting complications. Ongoing research and improved tracking of long-term outcomes are needed to guide future care.

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Ethical guidelines: This article does not involve studies with human participants or animals conducted by the authors. Therefore, ethical approval and informed consent were not required.

Conflict of Interest: The authors declare that they have no Conflict of Interest.

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