

## Appendicular Torsion: A Case Report And A Review of The Pertinent Literature

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**Received date:** 07 March 2023; **Accepted date:** 24 March 2023; **Published date:** 01 April 2023

**Citation:** Montali F, Boriani E, Stefania B, Annichiarico A, Virgilio E, et al. (2023) Appendicular Torsion: A Case Report And A Review of The Pertinent Literature. J Med Case Rep Case Series 4(05): <https://doi.org/10.38207/JMCRCS/2023/APR04050127>

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### Abstract

Appendicular torsion (AT) is a rare disorder often diagnosed intra-operatively during a diagnostic laparoscopy (DL). AT is hardly detected by pre-operative radiologic investigations such as abdominal ultrasound (US). The anticlockwise torsion can completely obstruct the appendicular lumen compromising blood supply and leading to strangulation, venous infarction, and bacterial translocation. Clinical presentation is undistinguishable from acute appendicitis and must be included in the differential diagnosis of patients with right lower quadrant abdominal pain (RLQAP). Herein we report a rare case of a 24-year-old female with a 200-degree clockwise primary rotation of the retro-cecal appendix, and we offer a review of the pertinent literature.

**Keywords:** appendix, torsion, clockwise, emergency surgery.

### Introduction

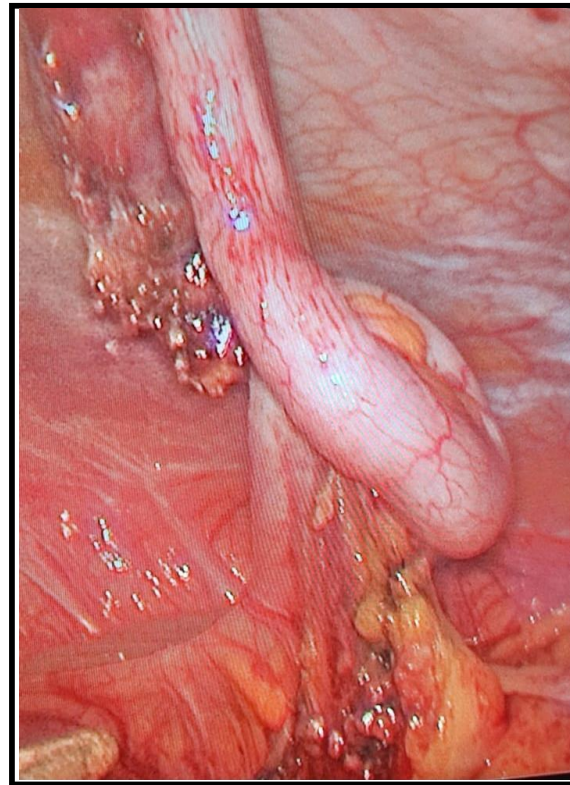
Appendicular torsion (AT) is a rare condition, often diagnosed intraoperatively and clinically indistinguishable from acute appendicitis, one of the most typical causes of urgent surgery [1]. AT can be primitive (or idiopathic) when related to specific anatomical features such as a lengthy appendix, a fan-shaped mesoappendix with a narrow base, or the absence of azygotic folds, which usually fix the appendix laterally [2,3]. Secondary forms of AT occur when the twist is after other pathological conditions like coprolith impaction, mucocele, carcinoid tumor, mesoappendiceal lipoma, foreign bodies, or lymphadenitis [4,5]. AT symptoms usually mimic the ones associated with

acute appendicitis: abdominal pain in the right iliac fossa, nausea, and vomiting. Consequently, AT should be included in the differential diagnosis of patients with right lower quadrant abdominal pain (RLQAP). Some findings on pre-operative radiologic imaging could suggest the presence of a torsion - particularly the secondary forms of AT - but abdominal US is not the gold standard to detect. An abdominal CT scan is undoubtedly a more sensitive examination, but it is not always performed in the preoperative workup. For all these reasons, AT is most frequently diagnosed during a diagnostic laparoscopy (DL) [6].

### Case Report

A 24-year-old woman presented to the emergency department complaining of a 3-day history of colicky pain in the right iliac fossa, anorexia, and vomiting. There was no significant record in her past medical history. A physical examination of the abdomen revealed pain localized in the right iliac fossa and distention, guarding, and rebound tenderness. Blood tests showed a total leucocyte count of 15,300/mm and a C-reactive protein level of 0.08 mg/dL. The first bedside ultrasonography did not detect any clear signs of appendichopathy. After an unremarkable gynecological consultation, a second US was executed after 24 hours, showing an amount of collection in the right iliac fossa with local lymphadenitis. An emergency appendectomy with a

laparoscopic approach was performed. Intraoperatively, there was evidence of torsion of the vermiform appendix with a clockwise rotation of 200 degrees around 1 cm from the base of the appendix (**Figure 1**). The appendix appeared retrocausal, long, and congested. The mesentery was short compared to the length of the appendix. Some adhesions were present between the appendix and the surrounding tissues. We finally proceeded to remove the appendix. Histopathology confirmed the AT diagnosis: a luminal dilatation was found distally to the torsion site, and the appendicular wall had already developed necrosis. The appendix measured 9.5 cm in length. The postoperative course was uneventful, and the patient was discharged on the fourth postoperative day.



**Figure 1:** Evidence of torsion of the vermiform appendix with a clockwise rotation of 200 degrees around 1 cm from the base of the appendix

**Discussion**

Paralleling appendicular neuralgia or Amyand’s hernia, appendicular torsion (AT) represents an unusual appendix disease in emergency surgery. AT clinically mimics acute appendicitis and leads the patient to a final diagnosis only at surgical exploration, often characterized by diagnostic laparoscopy. Although rare, AT is not a new nosological entity. In fact, AT secondary to a fecalith impaction was first described by Payne in 1918 [7]. To date, approximately 53 further cases have been reported in the literature (Table 1).

The population most frequently affected is male pediatric patients and young adults. The median age is 33 years old. Most of the cases are primitive (60 %). The anatomic feature most favoring AT is the length

of the appendix. Theoretically, the longer the appendix, the higher the risk of torsion. The most extended appendix ever reported measured 55 cm in length [8]. The literature review shows 20 AT cases in which the appendix was longer than 10 cm. The twist usually occurs in the long axis of the appendix and begins at the base or at least 1 cm from that, but it could also be more distal. The degree of torsion is usually between 180 and 1080 degrees. The direction is most commonly anticlockwise. Reviewing the pertinent literature, the tumors most frequently causing secondary AT are mucous cystadenomas (5 cases) and mucoceles (10 points) (Table 1).

**Table 1:** Appendicular Torsion : review of the literature

Authors	Year	Age	Sex	Degree/direction of rotation	Length of appendix, cm	Etiology or complication
Payne	1918	37	F	1,080/-	7	Fecalith impaction
Bevers	1920	35	F	720/-	7.6	UD
Mcfadden	1926	UD	M	180/-	12.7	UD
Flatley	1936	22	F	900/-	10.8	UD
Dickson	1953	60	F	720/-	11.5	Simple mucocele
Cassie	1953	25	M	540	10	UD
Carter	1959	8	F	>360/AC	-	UD
King-Pan	1965	18	F	-/-	10	Simple mucocele
Ghent	1966	21	M	450/AC	-	Primary
Ghent	1966	12	M	>360/C	7	Primary
Killam	1969	47	M	-/-	-	Mesoappendiceal lipoma

De Bruin	1969	28	F	360/-	10.5	UD
Legg	1973	29	M	360/-	10	UD
Finch	1974	38	F	360/-	-	UD
		12	M	270/AC	-	UD
Won	1977	35	M	-/-	12	UD
Petersen	1982	59	F	540	10	UD
William	1983	4	M	270/AC	-	UD
Dewan	1986	3	M	720/AC	-	UD
		6	F	1080/C	7	UD
		16	M	-/-	-	UD
Waters	1986	3	M	720/-	-	UD
Abu Zidan	1992	32	F, pregnant	-/C	5.9	Mucocele
Merret	1992	14	M	720/AC	14	Normal appendix
Fernando	1995	6	M	>360/AC	13.5	UD
Petersen	1998	44	M	540/-	5.5	UD
Uroz-Tristan	1998	5	M	360/AC	-	Absent mesoappendix
Tzilinis	2002	44	M	540/C	5.5	Primary
Moten	2002	44	F	360/AC	-	Primary
Oguzkurt	2004	2	M	270/AC	10	Duplicated colon and appendix
Bowling	2006	Adult	F	-/-	8	UD
Bestman	2006	35	F	-/-	7.5	Primary
Sarin	2006	9	M	270/C	8	Normal appendix
Rajendran	2006	29	F	360/-	11	Mucocele
Karger	2007	34	M	180/C	10	Mucinous cystadenoma
Rudloff	2007	28	F	900/C	5	Mucocele
Herbert	2007	59	M	-/-	12	Mucinous cystadenoma
Hamada	2007	79	M	180/AC		Mucinous cystadenoma
Wani	2008	76	M	540/AC	10	Fecalith
Montes-Tapia	2009	3	M	-/-		UD
Wani	2010	38	F	180/C	20	Adhesion from ovarian mucocele torsion
Lee	2011	78	F	900/AC	10.5	Mucocele
Marsdin	2011	48	M	360/C		UD
Dimitriadis	2012	52	F	540/AC	9	Caecal malposition
Mishin	2012	30	M	360/C	11	Mucinous cystoadenoma

Stark	2014	34	F	720/C	8	Mucinous cystoadenoma
Grebic	2015	70	M	1800/C	9	Mesoappendiceal lipoma
Dubhashi	2016	52	F	180/C	8	UD
Siddharth	2016	52	F	180/AC	8	Primary
Ejtehadi	2017	81	M	-/-	-	Mucocele
Wan Assan	2017	30	M	720/AC	12	Mucocele
Knol	2020	66	F	-/-	9.6	Mucocele
Nyandoro	2022	5	M	-/-	-	Mucocele
Current	2022	24	F	200/C	10	Primary

From the pathophysiological point of view, torsion can cause a complete luminal obstruction and distal dilatation; blood supply becomes compromised firstly by a reduced venous outflow and then by occlusion of the appendicular artery. The resulting appendicular infarction leads to a bacterial translocation that presents clinically as an acute abdomen. In primary torsion, specimen examination shows secondary ischemic or necrotic changes and luminal dilatation distal to the torsion site without any other lesion [9].

The appendix, being a relatively mobile organ, can twist on itself and involve other organs. Singal reported a case in which the appendix caused intestinal obstruction by forming a band on the abdominal wall or an adjacent loop of bowel kinking the bowel itself; intraoperative findings revealed an inflamed appendix that was rotated around the ileum, forming a sort of a mass [10].

The presented case is a primary form of AT with a clockwise rotation diagnosed intraoperatively. As seen in our experience, abdominal US

is not the gold standard tool for the preoperative diagnosis of appendicular torsion; to date, only Uroz-Tristan et al. mentioned the US for AT [11]. On the other hand, the US represents the right choice for simple acute appendychothy. In our case report, the torsion was idiopathic with no evidence of local lesion causing rotation. Treatment of AT is dependent on the underlying cause. An appendectomy is sufficient in case of a primary torsion without any abnormal lesions. However, using conservative therapy with antibiotics for AT can cause necrosis of the appendix, leading to perforation of the appendix and peritonitis. The optimal treatment should consist of prompt laparoscopic detorsion and appendectomy to avoid complications secondary to appendiceal perforation and potential intraperitoneal spillage of appendiceal or mass contents. Despite being a surgical rarity, AT should always be considered in the differential diagnosis of patients with right lower quadrant abdominal pain (RLQAP).

## Conclusion

AT shows a clinical presentation similar to acute appendicitis. Preoperative diagnosis can be reached through a preoperative contrast-enhanced CT scan of the abdomen. For secondary forms of AT, a tumor must be excluded. AT must be included in the differential diagnosis of pain localized in the right iliac fossa.

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