

Sudden/nocturnal onset of acute abdominal pain, lasting less than a day and accompanied by vomiting: a tell-tale sign of ovarian torsion

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Abstract The purpose of the study was to construct a clinical profile of a patient more likely to have ovarian torsion (OT). The study design was a retrospective chart review (Canadian Task Force Classification II-3). The study was done in a tertiary referral center setting. Patients were 78 women who underwent laparoscopy for suspected ovarian torsion. Intervention done was urgent laparoscopic surgery. The main outcome measure was a comparison of demographic data and the presenting signs and symptoms of the women with and without laparoscopically proven OT. Multivariable analysis was performed with a logistic regression model in order to determine the independent risk predictors for OT. The following factors were found to be

predictive of OT: vomiting (OR=5.67, 95% CI 1.69–19.0, $p=0.005$); duration of pain less than a day (OR=3.74, 95% CI 1.24–11.3, $p=0.02$), and sudden/nocturnal onset of pain (OR=4.13, 95% CI 1.19–14.3, $p=0.02$). The model was found to be adequate, with a c value of 0.798. A patient presenting with an episode of pain lasting less than a day that started suddenly and or at night, accompanied by vomiting is more likely to have OT on urgent laparoscopy.

Keywords Ovary · Adnexa · Torsion · Pain ·
Emergency laparoscopy

Introduction

Ovarian torsion (OT) remains one of the most challenging diagnoses in the gynecologic emergency room. A wide array of symptoms have been linked to surgically proven OT including pelvic pain of sudden onset, nausea and/or vomiting, sharp/stabbing pain, crampy/colicky pain, radiation of pain to flank, back, or groin, lower quadrant pain, and prior episodes of pain [1]. However, as the clinical symptoms of OT are not specific, visual examination at operation remains the only means for definitive diagnosis.

Imaging modalities, including modern ultrasonographic studies, were so far shown to be of little help in improving preoperative diagnostic accuracy. Laboratory tests are also currently of limited clinical value in enhancing the accurate diagnosis of OT. Despite these diagnostic difficulties, it is extremely important to achieve an accurate preoperative diagnosis of OT, since this condition occurs mostly in adolescent girls and women of childbearing age. In these young women, any delay in diagnosis can lead to ischemic necrosis and ovarian loss [2].

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Table 1 Presenting signs and symptoms among 78 women undergoing laparoscopy for suspected ovarian torsion

Symptoms and signs	Torsion (n=36), n (%)	No torsion, (n=42), n (%)	P value
Symptoms			
Pain	35 (97.2)	40 (95.2)	0.99
Vomiting	18 (50)	6 (14.3)	0.001
Nausea	9 (25)	11 (26.2)	0.9
Diarrhea	4 (11.1)	2 (4.8)	0.41
Signs			
Rebound	4(11.1)	10 (25)	0.12
Guarding	2 (5.6)	9 (21.9)	0.04
Adnexal tenderness ^a	22 (62.9)	33 (82.5)	0.06
Enlarged adnexa	19 (54.3)	0.48	
Cervical motion tenderness ^a	2 (5.7)	8 (20.5)	0.09

^a Complete recording of pelvic examination was available in 75 patients

We have recently re-examined the accuracy of the preoperative diagnosis of OT in our department [3] and found that despite 20 years of research [4–7], the accuracy of the preoperative diagnosis of OT, 46.1%, has not improved over our previously published rates [8], as well as over the rates reported by others [9, 10].

The aim of this study was to identify distinct clinical features that are strongly associated with a laparoscopically proven diagnosis of OT and thus may improve our ability to make an accurate preoperative diagnosis.

Material and methods

The design of our study, as was previously reported in detail [3], was based upon a retrospective computerized chart review conducted at Israel's largest tertiary referral center. The computerized medical records program used in our medical center was Clinic-Care (Clinic-Care, Ness technologies, Tel-Aviv, Israel).

Charts of all women undergoing laparoscopy from November 1, 2006 through February 28, 2008 were reviewed. Only women who underwent laparoscopy for suspected OT were included in our study. A single investigator (S. B.) reviewed each chart and abstracted the data. Another investigator (R. M.) was consulted regarding inclusion of patients' data in the study whenever a question arose. R. M. also reviewed the extracted data and ten charts to assess the inter-rater variability.

All preoperative physician notes and records, including emergency room admitting history and physical examination notes, were reviewed for abstraction. Pain characteristics such as “sharp,” “intermittent,” “ongoing,” “worsening,” and “sudden onset” were recorded as positive only if these exact terms were charted in one of the above notes, and only if these notes were recorded by the physician who decided that operation was necessary.

Pain characteristics such as duration, radiation, and associated symptoms such as nausea and vomiting were also recorded.

Table 2 Pain characteristics among 78 women undergoing laparoscopy for suspected ovarian torsion

		Torsion (n=36)	No torsion (n=42)	P value
Onset	Sudden onset/woke from sleep	16 (44.4)	6 (14.3)	0.003
	Coitus-related ^a	1/6 (16.7)	2/5 (40)	0.54
Radiation to leg		2 (5.6)	1 (2.4)	0.59
Side	Right-sided	20 (55.6)	18 (42.9)	0.19
	Left-sided	14 (38.9)	15 (35.7)	
	Bilateral	0	3 (7.1)	
	Not specified	2 (5.5)	6 (14.3)	
Duration	<1 day	22 (6.1)	9 (21.4)	0.0004
Previous event of pain		12 (33.3)	18 (42.9)	0.39
Intermittence	Intermittent pain	8 (22.2)	10 (23.8)	0.87
Pain worsening		11 (30.6)	22 (52.4)	0.06

^a Eleven women were specifically asked about coitus

Table 3 The sensitivity and specificity of parameters that were found to differ statistically between women with ($n=36$) or without ($n=42$) operative diagnosis of ovarian torsion

Parameter	Sensitivity	95% CI	Specificity	95% CI	
Pain that awoke from sleep/sudden onset	0.77	0.46–0.94	0.6	0.47–0.71	0.003
Duration of pain <1 day	0.61	0.43–0.76	0.78	0.36–0.61	0.0004
Vomiting	0.75	0.53–0.89	0.67	0.52–0.78	0.001
Infertility treatment	0.6	0.36–0.8	0.58	0.45–0.71	0.15
Tender adnexa	0.4	0.27–0.54	0.35	0.16–0.59	0.06
Previous event of pain	0.4	0.23–0.59	0.5	0.35–0.65	0.39
Guarding	0.18	0.32–0.52	0.48	0.36–0.61	0.04

Additional information abstracted included: patient characteristics such as previous abdominal surgeries, prior ovarian detorsion, history of ovarian cysts, earlier medical consultation concerning the present condition and fertility status.

Statistical analysis Statistical analyses were performed by using SAS statistical software (version 9.1, SAS Institute, Inc., Cary, NC). Categorical variables are presented as percentage, and continuous variables are presented as median (range). Comparison of variables was performed by Chi-square test or Fisher exact test for categorical variables and by Wilcoxon Rank Sum test for continuous variables. Two-sided $p < 0.05$ was considered significant. Multivariable analysis to determine the independent risk predictors for OT was performed by logistic regression model. Predictors that were significant in the univariable analysis with $p < 0.05$ were included in the model. Results of the logistic model are presented as odds ratios with 95% confidence intervals. Goodness-of-fit of the model was estimated by Hosmer–Lemeshow statistics [11]. The predictive discrimination ability of the model was estimated using a C-statistic corresponding to the area under a receiver operating characteristics curve.

This study was approved by the institutional review board of the Sheba Medical Center. No informed consent was needed.

Results

Seventy-eight women underwent laparoscopy in our department for suspected OT during the study period. In 36 (46.1%) of the patients, the preoperative diagnosis of OT was confirmed and laparoscopic adnexal detorsion was immediately performed. No operative or post-operative complications were noted.

At the time of the operation, 51 women (68%) were married. Median age, gravidity, and parity were 30 years (14–52 years), 1 (0–9), and 0 (0–5), respectively. Twenty women (25.6%) had undergone ovulation induction treatment immediately prior to their admission. Nineteen (24.4%) were pregnant. Thirty (38.5%) reported having a recent previous event of pain, and 38 (48.7%) had previously sought medical advice for pain or for an ovarian cyst. An ovarian cyst was diagnosed prior to the current event in 25 (32.0%) women. Thirty-seven women (47.4%) had previously undergone one or more abdominal surgeries before admission, of which 13 (35.1%) were laparoscopic ovarian detorsion. In thirty-six cases (46.1%) torsion was found during laparoscopy.

We compared the demographic data and the presenting signs and symptoms of the women with and without OT. Presenting signs and symptoms are listed in Table 1. The outlines of the pain characteristics are shown in Table 2.

Table 4 Multivariable analysis of parameters that were found to differ statistically between women with ($n=36$) or without ($n=42$) operative diagnosis of ovarian torsion

Variable		Number (N)	Torsion, N (%)	OR (95% CI)	P value
Sudden/nocturnal onset	Yes	22	16 (72.7)	4.13 (1.19–14.3)	0.02
	No	54	18 (33.3)		
Duration <1 day	Yes	31	22 (71.0)	3.74 (1.24–11.3)	0.02
	No	47	14 (29.8)		
Vomiting	Yes	24	18 (75.0)	5.67 (1.69–19.0)	0.005
	No	54	18 (33.3)		

Parameters that were found to differ statistically between the two groups ($p < 0.05$), being more common in the group with OT, were: duration of pain of less than 1 day ($p = 0.0004$), sudden/pain that awoke from sleep ($p = 0.003$), presence of vomiting ($p = 0.001$), and guarding on physical examination ($p = 0.04$).

The sensitivity and specificity of the above-mentioned parameters are listed in Table 3.

Parameters that differed between the two groups, but did not reach statistical significance ($0.05 < p < 0.15$), were: no previous abdominal operation ($p = 0.06$), nausea ($p = 0.9$), infertility treatment ($p = 0.15$), adnexal tenderness ($p = 0.06$), worsening pain ($p = 0.06$), rebound ($p = 0.12$), and cervical motion tenderness ($p = 0.09$).

Other parameters that were found to be similar in the two groups ($p > 0.15$) were: previous event of OT, PCO, previous medical consultation concerning this problem, previous event of pain, marital status, gravidity, parity, phase in the cycle, previous PID, use of OC, use of IUD, pregnancy, pregnancy age, fever, weakness, tremor, uterine enlargement, and adnexal mass.

Parameters that were statistically different between the two groups were included in a regression analysis model, as seen in Table 4.

Women presenting with vomiting were more likely (OR = 5.67) to have OT on laparoscopy ($p = 0.005$). When the pain lasted less than 1 day, OR was 3.74 ($p = 0.02$), and if the pain started suddenly or during sleep, OR was 4.13 ($p = 0.02$).

According to the Hosmer–Lemeshow goodness-of-fit statistic ($p = 0.34$), the model estimates fit the data at an acceptable level. C-statistic was equal to 0.798 (95% CI 0.699–0.896) demonstrating the good predictive discrimination ability of the model.

Discussion

The goal of this study was to identify clinical characteristics that may aid in improving the preoperative diagnosis of OT. Vomiting, which was previously reported as a common sign in OT [1, 12, 13] was found in our study to be strongly predictive of OT, since women that complained of vomiting were 5.7 times more likely to have OT. Practically all patients operated on for suspected OT had pain. Short duration of pain, less than a day, was also found as a good predictor of OT, as was sudden/nocturnal onset of pain. Other characteristics of pain were either seldom mentioned or not different between the women with and without OT.

As we recently reported [3], women who were operated on within 10 h after admission had a higher chance of having OT than those operated on more than 10 h after admission (56.2% vs. 28.6%; $p = 0.031$). This parameter was not included in our analysis since it is physician- and department-dependent.

This study is limited by the fact that our study population included only women who underwent surgery. We have no knowledge of the clinical characteristics of those patients who presented with abdominal pain, edematous ovary, or any other sign suspicious of OT, but were discharged without intervention. However, since OT is typically associated with unrelenting pain, although some women might have intermittent torsion with waxing and waning symptoms, it is unlikely that many patients were discharged with undiagnosed OT and were wrongly denied laparoscopic management at our institute. This assumption is strongly supported by our relatively high rate of laparoscopies performed in patients subsequently found not to have OT.

Another limitation of this study is the high awareness of the importance of early diagnosis and treatment of OT in our department. This is especially true in cases of women with previous torsion and women undergoing fertility treatment. Although this subgroup was too small to allow separate analysis for statistically significant differences, it seems that the physicians in our department tended to operate on women with history of previous torsion and/or fertility treatments even when other symptoms such as sudden/nocturnal onset of pain, duration < 24 h, and vomiting were lacking. Despite this, the rate of torsion was similar (46.1% in past torsion cases) or even significantly higher (60% in fertility patients) relative to the general population. We believe this high awareness can be justified considering the risk of diagnostic laparoscopy versus the risk of ovarian loss.

In conclusion, ovarian torsion is an elusive clinical diagnosis. In this study, we examined a group of 78 patients operated on for suspected OT and compared those who were found to have OT to those who were not. We constructed a “clinical profile” of a patient more likely to have OT. A woman presenting with pain lasting less than a day, that started suddenly and/or started at night, and was accompanied by vomiting, is more likely to have OT on urgent laparoscopy. We believe this observation can improve clinicians' ability to more accurately diagnose OT.

Conflict of interest There is no actual or potential conflict of interest in relation to this article.

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