

Five Year Retrospective Case Series of Adnexal Torsion

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ABSTRACT

Aims and Objectives: Adnexal torsion is a rare gynaecological emergency that requires an early surgical intervention to save the adnexa from irreversible damage. Our study is about clinical presentation and management approach of adnexal torsion in a tertiary care centre.

Study Design: Retrospective study.

Materials and Methods: Review of case records during the five years of 2008 November -2013 November in Amrita Institute of Medical Sciences, Kochi, India.

Results: Adnexal torsion was found mainly in the reproductive age. Ultrasound was the most commonly used imaging modality. Benign tumours predispose to torsion. Torsion occurred during

postovulatory period in many cases. Polycystic ovaries were a risk factor for unexplained torsion in younger age groups. Diagnosis of adnexal torsion was mostly intra operative by direct visualisation of the rotated adnexa. Laparoscopy was the preferred method of surgical intervention. Ovarian conservation was tried in majority of the child bearing age groups.

Conclusion: Adnexal torsion is a rare emergency which requires a high index of clinical suspicion for diagnosis as the symptoms are non specific. Imaging helps in diagnosis but most of them are diagnosed intra operatively. Laparoscopic conservative surgery is the preferred surgical approach especially in younger age groups. An early surgical intervention helps in salvaging the adnexa and prevents further complications.

Keywords: Procustes, PCA (principal component analysis), Statistical shape analysis

INTRODUCTION

Adnexal torsion is one of the few gynaecological surgical emergencies. Ovarian torsion is defined as partial or complete rotation of the ovarian vascular pedicle causing obstruction to venous outflow and arterial inflow [1]. When fallopian tube also twists with the ovary it is known as adnexal torsion [2]. Adnexal torsion mostly occurs in the child bearing group, but is not uncommon in premenarchal girls or postmenopausal women [3]. It is usually associated with a cyst or a tumour, the most common being mature cystic teratoma [1]. As the symptoms are nonspecific it can lead to delay in diagnosing adnexal torsion. Laboratory investigations and imaging using Doppler scan, CT, MRI helps in diagnosis. However surgical intervention, preferably by laparoscopy is the gold standard for diagnosis and treatment of adnexal torsion. Conservative surgery such as detorsion with cystectomy or cyst aspiration is preferred to removal of the adnexa when possible.

MATERIALS AND METHODS

This study was undertaken after clearance from the ethical committee of Amrita Institute.

A retrospective analysis of our hospital surgical registry for the year 2008-2013 identified records of 70 patients with surgically proven adnexal torsion. Clinical information obtained from the patients' medical records included age, medical history, clinical signs and symptoms. Abdominal pain was defined as lower abdominal pain {pelvic}, diffuse pain and epigastric pain. The onset of pain till admission to the hospital was noted in days. Duration of associated symptoms was recorded in days. Fever with the body temperature exceeding 37.7°C [4] and Leukocytosis when WBC counts greater than 10,800/mm³ was considered as clinically significant values [5]. Imaging, operative findings and histopathological reports were obtained from the case records.

STATISTICAL ANALYSIS

Statistical analysis was performed with SPSS statistics 20. All continuous parameters are presented as means ± SD. All categorical parameters as presented in percentage. Comparing the average of parameters between two groups, those following the normal distributions independent sample t-test was used. Those not following the normal distributions, Mann Whitney U-test were used. Chi-Square Test was used to find the association between two categorical variables. p-value < 0.05 is considered as statistically significant.

RESULTS

Clinical Presentation

The median age of the patients was 25.5 y (11-91y). Two out of the 70 patients were pre menarchal (2.9%) and 12 were postmenopausal women (17.1%). Lower abdominal pain was the main symptom seen. Apart from pain, other clinical signs and symptoms were nausea, vomiting, dysuria, urinary retention, diarrhea, constipation, vaginal spotting and menorrhagia. We had two cases (2.9%) of early weeks of pregnancy with torsion. Torsion occurred in 35 cases (50%) during post ovulatory period and 17 cases (24.3%) during pre ovulatory period. Two cases were asymptomatic in whom ovarian cyst was incidentally detected by ultrasound during health check up.

In our patients palpable mass was seen in 30 cases (42.9%) with tenderness in 18 cases (25.7%) and Leukocytosis in 31 cases (44.1%). Anaemia was reported preoperatively in three cases and required blood transfusion.

Ultrasound was performed in all cases and adnexal mass was reported in 69 (98.6%) with diagnosis of torsion in four. Doppler was done only in 21 cases and torsion was diagnosed in 14 cases. CT scan done in 13 cases (18.6%) with diagnosis of torsion made in three. MRI was done in seven cases (11.4%) in which three

were diagnosed as torsion. The other ultrasound findings were ovarian cyst in 32 cases (45.3%), ovarian cyst with free fluid in 12 cases (16.8%), complexcyst, hemorrhagiccyst, dermoidcyst and multiloculated cyst.

Polycystic ovaries were diagnosed in the contra lateral ovary by imaging in 14 cases pre operatively [Table/Fig-1] and four cases in the follow up period. Of the 18 cases (25.7%) diagnosed as polycystic ovaries, 10 cases had tumours also as another risk factor for torsion.

CT Scan

A 20-year-old presented with abdominal pain of two days duration. CT scan showed torsion of left ovary 7x5x5cm with polycystic right ovary.



[Table/Fig-1]: CT scan showed torsion of left ovary

Surgery

All the patients under went surgical procedure in which 13 cases (18.6%) had laparotomy and 57cases (81.4%) underwent laparoscopy. The surgical findings were isolated torsion ovary in 40cases (57.1%), combined ovarian and fallopian tube 15 (21.3%), isolated tubal torsion in 5 cases (7.1%) and paraovariancyst/ paratubalcyst in 10cases (14.3%). The risk factors for adnexal torsion found in our study were tumours, adhesions, hydrosalpinx and polycystic ovaries.

The size of the mass in adnexal torsion was <5cm in 12 cases (17.1%), 5-10 cm in 50 cases (71.4%) and > 10 cm in 8 cases (11.4%). Right sided torsion was seen in 39 cases (55.7%), left sided in 30 cases (42.9%) and bilateral in 1case (1.4%), who was a postmenopausal woman with adnexal mass on both ovaries.

Detorsion was done in 1case (1.4%), detorsion with cystectomy in 37(52.9%), salpingoophorectomy in 18 cases (25.7%), salpingectomy in 5 cases (7.1%), abdominal hysterectomy with BSO in 6cases (8.6%) and lap hysterectomy with BSO in 3 cases (4.3%).

In spite of bluish- black appearing ovaries conservative surgery was done in 5 cases. Follow up over a period of 6months to 2 years by Ultrasound was done in all five cases. Ovarian function was assessed by the presence of follicles.

Pathological examination of all specimens was done. Results are revealed in [Table/Fig-2].

DISCUSSION

Awareness and high level of clinical suspicion of adnexal torsion with imaging helps in early diagnosis and appropriate management of the condition. Delay in the diagnosis is due to nonspecific symptoms and varied imaging.

Even though adnexal torsion occurs in all age groups, it is most commonly seen in reproductive age groups [6,7]. In this study also majority of the torsion was seen in younger age groups [Table/Fig-3].

Benign RETE cyst	1	1.4%
Borderline serous cyst adenoma incystadenofibroma	1	1.4%
Cystic follicle	2	2.9%
Teratoma,hemorrhagic necrosis	3	4.3%
Teratoma	13	18.6%
Immature teratoma grade 3 ,hemorrhagic necrosis	1	1.4%
Serous cyst adenoma	11	15.7%
Mucinous cyst adenoma	5	7.1%
Endometriotic cyst	2	2.9%
Hemorrhagic necrosis	12	17.1%
Fimbrial cyst	1	1.4%
Follicular cyst	2	2.9%
Paraovarian cyst	4	5.7%
Paraovarian cystadenofibroma	1	1.4%
Paraovarian abscess with paraovarian cyst	1	1.4%
Paratubal cyst, hydrosalpinx	1	1.4%
Paratubalcyst,hemorrhagic necrosis	1	1.4%
Paramesonephric cyst, hemorrhagic necrosis, torsion tube	1	1.4%
Hemorrhagic necrosis ,torsion tube, hydrosalpinx	1	1.4%
Hemorrhagic necrosis, torsion tube	1	1.4%
Dysgerminoma ,hemorrhagic necrosis	1	1.4%
Poorly differentiated sex cord tumour	1	1.4%
Sclerosing stromal tumour, hemorrhagic necrosis	1	1.4%
R -Papillary serous cystadenofibroma L-Serous cyst adenoma	1	1.4%

[Table/Fig-2]: Pathological examination of specimens

Lower abdominal pain (87.1%) was the main symptom. Other associated symptoms and signs were nausea and vomiting, lower urinary symptoms, fever, leukocytosis, palpable mass, tenderness and vaginal bleeding [Table/Fig-4]. In a study of 179 patients, the clinical features of pelvic pain was found in 82%, nausea/vomiting in 49%, leukocytosis in 20.1%, fever in 7.8% and lower urinary symptoms in 14.5% [8].

Very rarely torsion may result in anaemia due to haemorrhage and may require blood transfusion [9]. We had three cases of anaemia (4 gm%, 7gm%, 8gm%) which required blood transfusion. One of our patients with hemorrhagic necrosis had an Hb of 4gm% [Table/Fig-5].

CT scan- 25 year old presented with abdominal pain and distension of 5 days, vomiting and urinary retention of 1day duration and her Hb was 4gm%. CT scan suggestive of hemorrhagic cyst 26x10 cm. Intra operative diagnoses was left sided ovarian torsion with hemorrhagic necrosis.

Yet another complication of torsion is adnexal necrosis. This may result in infection with associated leukocytosis.

Maternal ovarian torsion during pregnancy is a rare event and occurs mainly in the first trimester. We had two cases of early pregnancy (5-6 wk) with ovarian torsion and they underwent elective abortion. The incidence of torsion with pregnancy was low (<6%) as seen in the other study [10] [Table/Fig-3].

Torsion occurred in the postovulatory period in most of the cases. It may be due to pelvic venous congestion at the time of ovulation or pre-menstrual phase that causes torsion [11].

The sensitivity of ultrasound in diagnosing torsion ranges from 40-75% [12]. Twisted adnexal masses are often mid line, located anterior to the uterus and the other findings are cystic, solid or complex mass with or without pelvic free fluid, thickening of the wall and cystic haemorrhage. Multiple peripheral cysts in the setting of pain with a unilateral enlarged ovary are helpful in diagnosing torsion [13]. Two small series of 20 patients with suspected torsion found whirlpool sign (twisted vascular pedicle) to have a sensitivity of more

	Our study	Kandasami Vijayalakshmi et al., [7]	C Spinelli et al., [14]	Vijayaraghavan [15]
No: of patients	70	18	30	21
Age	11-91y	25-72y	2months -18y	7-69y
Reproductive Age <45yrs	82.6%	66.7%		
Parity	50%	88.9%		
Pregnancy	2.9%			4.7%
Menopause	17%	11%		
Pain abdomen	95.7%	77.8%	100%	100%
Nausea/Vomiting	65.7%	27.8%	56.7%	
Fever	12.9%	5.6%	20%	
leukocytosis	44%		63.3%	
Dysuria	8.6%	5.6%		
Palpable mass	42.9%	22.2%		47.6%
Tenderness	25.7%	38.9%		23.8%
USG with Doppler)Diagnosed Torsion	25.7%		63%	95.2%
Freefluid in POD	23.8%		26.7%	
Right sided	55.7%	50%	70%	
Left	42.9%	38.9%	30%	
Bilateral	1.4%	11.1%		
Size [5-10cm]	71.4%	33.3%		
>10cm	11.4%	44.4%		
Mature cystic teratoma	22.8%	16.7%	16.7%	28.5%
Mucinous cyst adenoma	7.1%	33.3%	3.3%	9.52%
Serous cyst adenoma	15.7%	16.7%		47.6%
Hemorrhagic necrosis	30.4%			9.52%
% Laparoscopy	81.4%		40%	
Open method	18.6 %		60%	
Conservative surgery	64.3%		46.7%	
Radical surgery	45.7%		53.3%	
Time Interval	24hrs		12hrs	
Median				

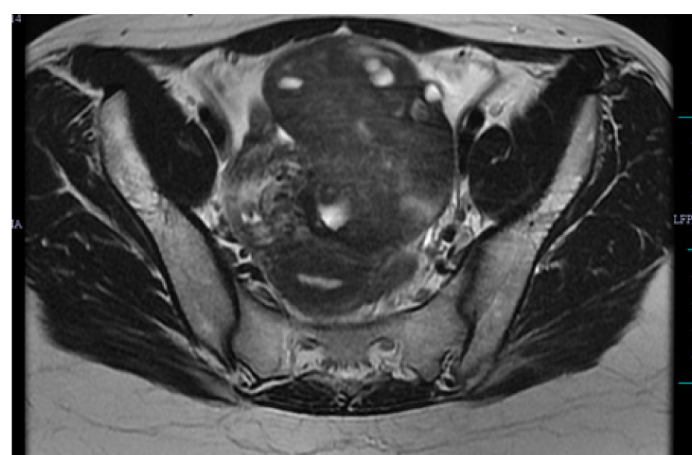
[Table/Fig-3]: Our study compared with other studies

Pelvic pain	61	87%
Epigastric pain	4	5.7%
Diffuse abdominal pain	2	2.9%
Asymptomatic	2	2.9%
Nausea/ vomiting	46	65.7%
Fever	9	12.9%
Dysuria	5	8.6%
Urinary retention	1	1.4%
Constipation	5	7.1%
Diarrhoea	1	1.4%
Vaginal spotting	1	1.4%
Menorrhagia	1	1.4%

[Table/Fig-4]: Symptoms\$ signs



[Table/Fig-5]: CT scan of left adnexal torsion reported as haemorrhagic cyst 26x10 cm



[Table/Fig-6]: MRI scan reported as torsion right ovary 8x 7x 6cm

than 90% for diagnosing torsion [9,16]. We could diagnose adnexal torsion in 75% of cases intra operatively by direct visualization of rotated adnexa. Torsion was diagnosed by ultrasound with doppler in 25.7%, CT scan in 4.3% and MRI [Table/Fig-6] in 4.3% of cases performed under the respective imaging in our study. In a study of 35 patients of adnexal torsion, correct diagnosis by clinical and sonography was only in 26% and with CT scan in 34% of cases [17].

Twenty three year old with right sided lower abdominal pain and vomiting of two days duration. MRI reported-torsion right ovary 8x7x6cm.

Ovarian mass is the primary risk factor for torsion. Few case series have reported that there is more likelihood of torsion [18] when the size of the ovarian mass is 5cm or larger. Adnexal mass were seen in 98.6 % in this study. There were 50 cases (71.4%) between the sizes of 5-10 cm which had undergone torsion [Table/Fig-3].In about

34 [48.6%] cases tumours was found to be a risk factor for torsion. 11 cases (15.7%) there was no risk factor for torsion. Others had a combination of adhesions, hydrosalpinx and polycystic ovaries as a risk for torsion.

Torsion of the right ovary was more common than the left, probably due to presence of sigmoid on left and longer right ligament of ovary [19]. In our study the adnexal torsion of the right side was about 55.7% when compared to the left side [Table/Fig-3].

Unexplained ovarian torsion in adolescents and young adults with PCOD has been reported [20]. Our data also showed few cases of polycystic ovaries which have undergone torsion.

Isolated torsion of the fallopian tube is less common, but may also occur and adversely impact the tubal function [21]. Isolated tubal torsion associated with hydrosalpinx were seen in 69% of cases and salpingectomy was performed in 11/13 cases in a study [22]. We had 5 isolated tubal torsions and the risk factors seen were paraovarian cyst and hydrosalpinx. All five underwent lap salpingectomy as the tubes were non-viable [Table/Fig-7].

	Boukaidist et al., [22]	Our study
No of cases of isolated tubal torsion	13	5
Site of fallopian tube	Left-9 (69%)	Right-3 (66%)
Salpingectomy	11	5
Risk factors		
Hydrosalpinx	9	1
Paraovarian cyst	-	4
HPE-ischemic infarction	3(50%)	5(100%)

[Table/Fig-7]: Comparative Study of fallopian tube torsion

Torsion of paratubal or paraovarian cyst may also occur and they increase the risk of tubal torsion [23]. Torsion of Para ovarian/tubal cysts was present in 10 cases in our study.

Laparoscopy is the recommended procedure for adnexal torsion as it gives better visualization, shorter hospital stay, fewer postoperative complications, small scar, less blood loss and analgesia requirement [6,24]. Laparoscopy was done in 81.7% of the torsion cases in our study and was found to be a reliable method [Table/Fig-8].

Over the past years, salpingoophorectomy was the standard treatment for adnexal torsion due to fear of thromboembolism. But recent studies suggest a conservative approach of detorsion with ovarian cystectomy for benign tumours [24]. Salpingoophorectomy is preferred in post menopausal women, suspected malignancy and non-viable ovary [3]. We did radical surgery in 11 (15.7%) postmenopausal women who had torsion. We could do conservative procedure in 35 patients (71.45%) who were below 40 y.

Hemorrhagic necrosis was seen in 21 cases (30.4%) of which 5 cases (23.8%) underwent ovarian cystectomy and 16 cases (76.2%) underwent radical surgery [Table/Fig-9]. Various studies have shown that even though the adnexa appear blue or black, it does not imply that it is nonviable and hence detorsion is done to retain the ovarian function [3,24,25].

The reported pathology in our study was benign in 66cases (94.3%) and malignant in 4 cases (5.7%). Due to fixity and adhesion, malignant as well as endometriotic cyst rarely undergoes torsion [3]. Case series have reported about malignancy in 2% or fewer of the cases of torsion [6,18]. Torsion are more likely to occur in an underlying ovarian lesion such as a tumour or cyst [1]. As consistent with various studies, in our study also teratoma (22.8%) was the commonest benign neoplasm for the ovarian torsion [17] [Table/Fig-3,8].

The complications of torsion we had were anaemia (3 cases), hemorrhagic necrosis (21 cases) and 1 case each of paraovarian and ovarian abscess. During the postoperative period there were three superficial wound infections, all of them responded with antibiotics. A 16-year-old girl who was a known case of Kartageners syndrome

died on second postoperative day after salpingo ophorectomy done for teratoma with extensive hemorrhagic necrosis.

	Nurith et al., [17]	Ziv Tsafir et al., [24]	Our Study
Age in Years (Median)	5-85 (38.5)	3-16 (12)	11-91 (25.5)
Premenarchal	3(9%)	20(90%)	2(2.9%)
Postmenopausal	10(29%)	-	12(17%)
Pregnancy	-	-	2(2.9%)
Asymptomatic	-	-	2(2.9%)
Pain Abdomen	35(100%)	22(100%)	67(95.7%)
Nausea/Vomiting	16(46%)	13(59%)	46(65.7%)
Fever	7(20%)	2(9%)	9(12.9%)
Peritoneal Signs	12(34%)	6(27.3%)	18(25.7%)
Leukocytosis	15(43%)	8(36%)	31(44%)
USG-Done	33(94%)	22(100%)	70(100%)
-Torsion Diagnosed	9(26%)	-	4(5.6%)
-Mass/Enlarged Ovary	31(91%)	8(36.3%)	69(98.6%)
Doppler (Torsion Diagnosed/Done)	6/11(55%)	6/22(27%)	14/21(66%)
Ctscan (Torsion Diagnosed/Done)	12/35(35%)	0/1	3/13(23%)
MRI (Torsion Diagnosed/Done)	-	-	3/7(42.8%)
Laparoscopy Done	10(29%)	17(77.2%)	57(81.4%)
Hemorrhagic Necrosis	20(57%)	-	21(30.4%)
Right Adnexa	18(51.4%)	15(68.2%)	39(55.7%)
Size (5-10cm)	-	5(22.7%)	50(71.4%)
Ovary	13(37%)	18(81.8%)	40(57.1%)
Ovary and Fallopian Tube	21(60%)	-	15(21.3%)
Fallopian Tube	1(3%)	-	5(7.1%)
Paraovarian/Paratubal Cyst	-	4	10(14.3%)
HPR (Mature Cystic Teratoma)	8(32%)	1(4.5%)	16(22.8%)
Conservative Surgery	11(31.5%)	19(86.4%)	38(54.3%)
Time Interval (Median) in Hours	-	20.75	24
Total Number of Cases	35	22	70

[Table/Fig-8]: Comparison of our study with other studies

p-value*			Hemorrhagic necrosis [21cases]	Without hemorrhagic necrosis [48cases]
0.003	Type of surgery	CS	5(23.8%)	32(66.7%)
		RS	16(76.2%)	16(33.3%)
0.075	WBC<11,000	CS	8(20.5%)	31(79.5%)
		RS	13(43.3%)	17(56.7%)

[Table/Fig-9]: Hemorrhagic necrosis,leukocytosis vs type of surgery

* Chi square test

As the time interval between symptoms to surgery is prolonged, the rate of ovarian conservation is reduced [26]. The time interval from admission to the surgery in our patients was 24h (median) and 38 cases (54.3%) had conservative surgery. In a study of ovarian torsion in children, the time interval was 20.75 h (median) and 80.4 % of cases were treated conservatively [24] [Table/Fig-8].

Even though an ovary has undergone hemorrhagic necrosis, it regains ovarian function as demonstrated by presence of follicles in sonography [27]. Out of the 5 cases we had on follow up of 6 months to 2 years, 4 had follicles and 1 ovary with no blood flow [Table/Fig-10]. Traditionally, necrotic appearance has been synonymous of oophorectomy; however current trend depends ovary preservation [27].

		Lasobeteorce et al., [27]	Our Study
1	Total number	6	5
2	Mean age	8.5y(3-12)	21.4y(11-38)
3	Average size	5-8cm	6.6-9.2cm
4	Site(Right)	4	3
5	Time interval between onset of symptoms to surgery	6.5(1-15days)	5.4(2-14d)

[Table/Fig-10]: Follow of necrosed ovaries which were preserved

CONCLUSION

Diagnosis of ovarian torsion is a difficult task which requires good clinical awareness. High index of clinical suspicion is the most important factor in diagnosing adnexal torsion. Ultrasound with Doppler helps in diagnosing adnexal mass with torsion. Laparoscopy is not only useful for diagnosis but also for treating torsion with less morbidity. Conservative surgery is preferred for patients in the reproductive age group.

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