Adnexal Torsion: Clinic, Ultrasonographic, Pathologic Features and Current Management Trends

ADNEKSİAL TORSİYONLAR: KLİNİK, ULTRASONOGRAFİK, PATOLOJİK ÖZELLİKLERİ VE GÜNCEL TEDAVİ YÖNTEMLERİ

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Abstract

Objective: To evaluate the preoperative clinical signs and symptoms, and ultrasonographic analysis; intraoperative findings and postoperative histopathological results of torsion of adnexal tumors diagnosed intraoperatively.

Material and Methods: Patients diagnosed as torsion of adnexal tumor intraoperatively in our hospital between dates Jan2004 andJan2006 are analized retrospectively in this study.

Results: The median age was 38.17 year (range19-79 years). The most common presenting clinical symptom was abdominal pain (91.66%).All patients had ultrasonographic analysis of which 62.5%had semisolid mass appearence. Eleven (45.83%) patients had Doppler sonography and all had abnormal flow patterns (decreased or no flow). Of the 24 patients, 6 (25%) had laparoscopic surgery and 18 (75%) had laparotomy. The mean maximal diameter of tumors was 12.25±5.87 cm (range 5-30 cm). Fifty percent of the tumors were gangrenous. Gangrene formation was more likely to occur when the twists exceeded 2 turns. Eighteen (75%) of the 24 patients had unilateral salpingo-oophorectomy and all had benign pathology. One patient had only detorsion of the adnexa which had no gangrene formation and no excision procedure was performed due to age and desire for future fertility. Rest had more extensive procedures due to a possible malignancy potential of the twisted tumor. Of the 24 patients only two had malignant pathology (8.3%). The most common pathology reported was simple cyst (33.33%), and the next was mature cystic teratoma (16.66%).

Conclusion: Adnexal torsion is a common gynecologic emergency condition of especially the women at reproductive age period. Urgent diagnoses of the condition with clinical symptoms and ultrasonographic and Doppler analysis is important for the chance of conservative surgical procedures since many of the patients would have desire for future fertility. Laparoscopic surgery is gaining more popularity in gynecologic surgery. Highly benign potential of the twisted tumors and increased experience of the surgeons makes laparoscopical conservative surgery is more feasible in the world.

Key Words: Torsion; adnexa uteri; ultrasonography, doppler

Özet

Amaç: İntraoperatif olarak adneksiyal tümör torsiyonu tanısı alan hastaların preoperatif klinik ve ultrasonografik analizlerinin; intraoperatif bulgularının ve postoperatif histopatolojik sonuçlarının değerlendirilmesi.

Gereç ve Yöntemler: Hastanemizde Ocak 2004 - Ocak 2006 tarihleri arasında intraoperatif adneksiyal tümör torsiyonu tanısı almış 24 hasta retrospektif olarak değerlendirildi.

Bulgular: Ortalama yaş 38.17 yıl olarak bulundu (19-79 yıl). En sık rastlanan klinik semptom karın ağrısı idi (%91.66). Bütün hastalarda ultrasonografi yapılmış ve %62.5'inde semisolid kitle bulunmuştur. Onbir hastaya (%45.83) Doppler analizi uygulanmış ve bunların tamamında azalmış veya sıfırlamış kan akım paterni bulunmuştur. Hastaların %25'ine laparoskopik cerrahi,%75'ine laparotomi uygulanmıştır. Tümörlerin ortalama maksimal çapı 12.25±5.87 cm olarak bulunmuştur (5-30 cm). Tümörlerin %50'si gangrene olmuştu. Gangren oluşumu iki turdan fazla torsyone olmuş tümörlerde daha sık görülmüştür. Onsekiz hastaya (%75) unilateral salpingo-ooforektomi uygulanmış ve tamamının patoloji sonucu benign gelmiştir. Fertilitesinin korunmasını isteyen ve gangren formasyonu olmayan 1 hastaya sadece detorsiyon, geri kalan hastaların tümüne eksizyonel cerrahi uygulanmıştır. Hastaların sadece 2'sinde (%8.3) malign patoloji rapor edilmiştir. En sık rastlanan patolojik tanı %33 ile basit kist ve %16.66 ile matür kistik teratom olmuştur.

Sonuç: Adneksiyal kitle torsiyonu sıklıkla reprodüktif çağdaki kadınlarda rastlanan jinekolojik acillerdendir. Hastaların çoğunda fertilitesinin korunması isteği olduğu için, preoperatif klinik, ultrasonografik ve Doppler analizlerinin hızlı ve doğru değerlendirilmesi, erken tanı ve sonrasında konservatif cerrahi için önem kazanmaktadır. Jinekolojik cerrahi uygulamalarında laparoskopik cerrahinin popülaritesi gittikçe artmaktadır. Torsiyone olmuş adneksiyal tümörlerin yüksek benign potansiyeli ve cerrahların artan laparoskopik deneyimleri, dünyada laparoskopik konservatif cerrahi oranını arttırmakta ve daha geçerli kılmaktadır. Bizim hastanemizde de laparoskopik deneyim arttıkça bu tip vakalarda laparoskopik konservatif cerrahi daha fazla yaygınlaşacaktır.

Anahtar Kelimeler: Torsiyon; uterin adneksler; ultrasonografi, doppler

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Adnexal torsion is reported to be the fifth most common gynecologic emergency condition encountered with a prevalence of 2.7%.[1] It is a dreaded complication of ovarian tumors either in pregnant or non-pregnant state.

Torsion may occur without apparent cause; however, the initiating factors include intestinal peristalsis, alternate emptying and filling of the bladder, changes in size and position of uterus and the tumor itself during pregnancy, changes in the intraabdominal pressure resulting from vomiting and coughing, trauma and laxity of the abdominal wall.[2] The unusual mobility of the tumors, especially small rather than larger tumors with long pedicles will encourage torsion to occur. Further, the asymmetry of the tumor may determine the initial twist.[3] Gangrene or necrosis of the whole ovary frequently results from interference with its vascular supply, thus requiring removal of the ovary involved. Prompt diagnosis and surgical restoration of blood flow may possibly avoid irreversible adnexal damage. However, the diagnosis of adnexal torsion poses a difficult challenge, because the clinical symptoms are often misleading.

In the present study, the clinical presentation, management and histopathology of 24 patients who were confirmed to have torsion of adnexal tumors intraoperatively in our hospital were analyzed.

Material and Methods

This is a retrospective study of 24 cases with twisted ovarian tumors. Patients who were diagnosed to have torsion of adnexal tumors intraoperatively were included in this study. All cases were non pregnant. Marital status, age, gravidity, parity, clinical symptoms at the time of admission to our hospital, ultrasonographic analysis pre- and intraoperative findings, type of surgery performed and histopathological results were taken into consideration.

All the patients included in this study had preoperative ultrasonographic analysis. The sonograms were analyzed for the presence of a mass, fluid in the cul-de-sac, and associated uterine/adnexal findings. If a pelvic mass was present, its size, location and sonographic character were recorded. Patients who had a color Doppler sonography were also documented in our study.

Operations performed were grouped into 2 main groups as laparotomy (n= 18) and endoscopic surgery (n= 6). The type of surgery was planned according to patients age, fertility status, size of tumor and experience of the surgeon planning the operation. Location, size and number of twists of the tumor and gangrene in tumor if present were analyzed, intraoperatively. Spearman's correlation test was used for the relation between number of twists and gangrene formation. Histopathologies of the resected tumors were grouped as malignant or benign headings.

Results

Half of the patients were younger than 40 years of age. The average age was 38.17 (range 19-79 years).There were 2 virigo girls. Of the 22 married women, 4 were nulliparous, the remaining were parous ranging from 1 to 10 (Table 1).

Twenty-two of the patients (91.66%), presented with lower abdominal pain, which was

Table 1. Torsion of ovarian tumors according to patients' age, marital status and parity

		Married			Total	
Age	**Single**	**Para 0**	**Para 1-4**	**Para >4**	**No. of patients**	**%**
<20	1				1	4.16
20-29	1	3	4		8	33.33
30-39			3		3	12.5
40-49		1	5	1	7	29.17
>50			4	1	5	20.83
Total	2	4	16	2	24	
%	8.33	16.66	66.66	8.33	100	

Table 2. Patients' presenting symptoms and associated conditions.

Symptom	<24hrs	>24hrs	Total
Abdominal pain			
Right sided	7 (29.17%)	4 (16.67%)	11 (45.83%)
Left sided	2 (8.33%)	3 (12.5%)	5 (20.83%)
Not specified		6 (25%)	6 (25%)
Total number of patients	9 (37.5%)	13 (54.16%)	22 (91.66%)
Backache		1 (4.16%)	1
Abdominal mass	3(12.5%)		
Nausea and vomiting	2(8.33%)		
Fever	2(8.33%)		
Urinary symptoms	4(16.67%)		

acute (less than 24 hours duration) in nigne (37.5%); 13(54.16%) had abdominal pain for more than 24 hours; the longest was being over a month. One patient had presented to the oncology clinic with backache and she had bilateral ovarian cystic tumors twisted on the right side. The histopathology was borderline mucinous tumor on the right and benign mucinous cystic lesion on the left. Two of the patients had the symptom of abdominal mass only and no significant pain. One of these patients with abdominal mass had the histopathologic diagnosis of mature cystic teratoma and the other had theco-fibroma. Two patients with fever were found to have gangrenous tumors at laparotomy. Two patients with acute abdominal pain had also nausea and vomiting but they were not pregnant. Three patients were postmenopausal. One of the patients, who had total abdominal hysterectomy and unilateral salpingo-oophorectomy for a benign condition 10 years ago, was also operated for ovarian adnexal torsion at age 55 and had the histopathological diagnosis of mucinous cystadenoma. Her presenting symptom was chronic pain (Table 2).

Ultrasonography demonstrated an abnormal pelvic/adnexal mass related to the ovary and/or fallopian tubes in all patients (Table 3). The mass ranged in size from 5 to 30 cm in largest dimension with a mean of 12 cm. Cul-de-sac fluid was demonstrated in 8 patients. The ultrasonographic characteristics of the masses ranged from solid to cystic; 8 of the masses were primarily cystic, 1 mass was primarily solid and thus 23 of the masses had some cystic component. At 11 of 24 patients color Doppler sonography were performed and all had abnormal flow patterns (decreased or no blood flow). Quantification of flow with peak systolic velocities or centimeters per second or even detection as arterial or venous pattern was not possible in all cases because of the retrospective nature of this study.

Table 3. Preoperative USG findings.

Ultrasonographic appearence	No of patients	Presence of Cul De Sac fluid	Doppler
Cystic lesion	8	2	3
Semisolid lesion	15	4	6
Solid mass	1	2	2

Operations and Operative Findings

Types of operations were listed in Table 4. In 4 cases; the opposite ovary had also additional cystic pathology. The mean maximal diameter was 12.25 ± 5.87 cm (range 5-30 cm). The majority of tumors (83.34%) were from 5 to 19 cm (Table 5). Twelve of the tumors were gangrenous, while the other 12 were not. It would appear that the occurrence of gangrene and necrosis of the ovary was more likely when the number of twists exceeded 2 turns (9 out of 10) which is statistically significant (Spearman correlation test is used with a coefficient of 0.67; $p < 0.0001$) (Table 6).

Table 4. Distribution of the operations.

	Laparoscopy	Laparotomy
Unilateral salphingo-oophorectomy	6	13
Total abdominal hysterectomy + unilateral salphyngo-oophorectomy		1
Total abdominal hysterectomy+bilateral salphyngo-oophorectomy		2
Paraovarian cyst excision		1
Detorsion		1

Table 5. Torsion of ovarian tumors and maximal diameter of tumors.

Maximal diameter (cm)	No.	%
5-9	7	29.17
10-14	10	41.67
15-19	3	12.5
20-24	3	12.5
>24	1	4.17

Table 6. Gangrene in relation to the number of twists.

Number of twists	No. of patients	Gangrene	
		Yes	No
1	11	3	8
1.5	3		3
2	6	6	-
2.5	-	-	-
3	3	2	1
3.5	1	1	-
Total	**24**	**12**	**12**

One of the patients who was 24 years of age and was married, nulligravid and desires fertility; had detortion of the right sided triple-twisted adnexa and no organ excision was performed at the operation. No blood flow was observed at her preoperative color Doppler ultrasonography but postoperative first day color Doppler blood flow was in normal range. Long-term-follow-up was not possible since the patient did not admit to the hospital. (Table 6).

Of the 24 tumors; 22 were benign and 2 were malignant. The most common benign histopathology was simple cyst (33.33%). Only 4 of the patients were diagnosed as mature cystic teratoma in our study (16.66%). Extensive gangrene made histopathological identification of the tumors impossible in 3 cases (12.5%) and were defined as non specified by the pathologists. The 2 malignant tumors were bilateral malignant epithelial tumor and borderline mucinous tumor (Table 7).

Discussion

The incidence of twisted ovarian tumors was 6.9% and 7.4% in the studies of Lee and et al, Geist, respectively.[3,4] Usually, adnexal torsion is a process of benign neoplasms.[2,5-7]

Torsion of ovarian tumors can occur in all age groups. In our study, half of the patient population was younger than 40 years of age. Only 3 of the patients were at the postmenopausal period (12.5%). From a study of Malaysia,[3] 70.6% of the patients were under 40 years of age and 4 of them were postmenopausal (11.8%). In another study from Greece, 80% of the patients were under 50.[7] Ovarian tumoral torsion is more common premenopausally at the reproductive age group. This may be related benign ovarian cysts were more common in the premenopausal active ovarian functional period. Adnexal torsion is rare after pelvic inflammatory disease and pelvic endometriosis even if an endometrioma is present owing to associated pelvic adhesions.[8] Ovarian tumors are not very common in childhood; incidences of 0.79-4.3% have been quoted.[9,10]

Table 7. Histopathology.

Benign (21)		Malignant (2)	
Simple cyst	8	Malignant epithelial tumor	1
Mature cystic teratoma	4	Borderline mucinous tumor	1
Mucinous cystadenoma	2		
Endometriotic cyst	1		
Paraovarian cyst	1		
Thecofibroma	1		
Serous cystadenoma	1		
Not specified	3		

Abdominal pain, whether acute or chronic, was the most consistent symptom in 22 of the patients (91.66%). This symptom was consistent in 80.8% of patients in the study from France,[10] and 100% in the study from Malaysia.[3] Menstrual disturbances were not present in any patients who were in the reproductive period as most of the cysts were nonfunctional.

The reported incidence of torsion of ovaries in pregnancy, is ranges from 3.2% to 28.6%.[7-11] Torsion is said to be common during puerperium,[12] but none of the patients were pregnant or at the puerperal period in our study since this study was arranged in a gynecology clinic.

In the present study 13 (54.16%) of the 24 patients had torsion on the right side. This ratio was 67.7% in another study.[4] They had the idea that the presence of the sigmoid colon on the left side could have an inhibitory influence. However, an equal frequency of torsion on both sides was reported by Peterson et al.[2] They noted that medium sized tumors appeared to undergo torsion more frequently; about 71% of the tumors in our study measured 5-14 cm in maximal diameter. It was 50% in another study by Lee et al at the same maximal diameter.[4]

Benign tumors constituted 91.67% of total tumors with torsion (22 of 24 cases).These were 89% by Varras et al.[7] The most common histopathology in our study was simple cyst with accompanying infarction (8 of 23 histopathological diagnoses). In other studies, the most common finding was benign cystic teratoma with a percentage of 30.[2,3] In our study 4 out of 24 cases were diagnosed as benign cystic teratoma (16.67%). The histopathologies of the 3 tumors were not identifiable because of extensive gangrene. There is a correlation between the occurrence of gangrene and the number of twists in our study which is statistically significant (Spearman's correlation test). This correlation was not relevant in other studies.[2,3] But not in all cases gangrene occurs, it is possible that the twists were not tight enough or vessels fail to go into spasm, resulting in incomplete impairment of blood supply to the ovary. Several cases with up to as many as 9 complete turns without any apparent interruption of the blood supply have been reported by Peterson et al.[2] Rupture and infection associated with torsion of the ovary were uncommon in this study as with Lee et al.[3]

All the patients in this study had a preoperative ultrasonographic analysis. The most common sonographic finding (62.5%) was of a relatively echogenic mass containing some cystic component. The echogenic appearance is thought to relate to ovarian edema and possible hemorrhage.[13-15] One of the patients had a solid mass on sonography which was diagnosed as thecofibroma. Eight of the patients had solely cystic appearance. Cul-de-sac fluid was demonstrated at 8 patients. In the study conducted by Varras et al,[7] 80% had cystic, 5% had solid and rest had normal adnexal appearance and, cul de sac fluid was present in 55% of patients.

Ovarian blood flow is gradually compromised during the process of ovarian torsion. Colored Doppler sonography with its non-invasive modality is suitable for the accurate assessment of blood flow in various organs. It detects blood flow patterns within the ovarian vascular networks[16,17] and adds additional important information to the nonspecific morphological changes gathered by gray scale sonography.[18,19] In our study, 8 of the 24 patients had preoperative color Doppler sonography analysis and all had absent or decreased blood flow in the affected ovary. Teper et al.[20] also detected in their study that all patients had an absence of blood flow in the affected ovary. In conclusion, we believe that this non-invasive technique is an accurate mean of assessing perfusion to the ovary, adding essential information to the non-specific findings of both conventional ultrasonography and clinical presentation of ovarian torsion, thus enabling a more accurate preoperative diagnosis of this entity.

In a study from Greece,[21] preoperative serum levels of IL-6 were found to be significantly higher in patients proven to be ovarian torsion and they concluded that it may assist in promt diagnosis of ovarian torsion and allow atimely surgical intervention.

Laparoscopic surgery is gaining more popularity in gynecologic surgery. In our study, 25%

of the patients had laparoscopic surgery, other 75% had open surgery and one patient had conservative surgery (detorsion) in a laparotomy section. All the others had adnexal removal or more extensive organ excisions. In a very recent retrospective study by Ogbern et al,[22] 32% of the cases were operated laparoscopically and 20.6% of the cases had conservative surgery. In another retrospective study,[5] 46% of cases had laparoscopic surgery and 19% of the women had adnexa sparing procedure. In a study from France,[6] adnexa sparing procedure was performed in 102 women (66% with L/S and 34% with laparotomy). Postoperative febrile morbidity and hospital stay were significantly less in laparascopic sections. Normal sized ovaries with follicular development were encountered in detorsioned side more than 90% of cases. Oelsner et al[8] performed laparoscopy to all of the patients with adnexal torsion in their clinic and they applied detorsion to all of their patients even if the adnexa was appearance necrotic. They found out that the ovarian function in all the patients were preserved. So according to Olesner detorsion is the only procedure which should be performed and any additional procedure should be avoided.

The rarity of torsion in malignant tumors has been pointed out by Buttery et al.[12] The peak incidence of ovarian cancers was demonstrated by Jones et al, at ages 60-70.[23] Two cases with malignant ovarian tumors in our study were at ages 44 and 45 and they were relatively younger. The surgery in such patients will depend on several factors; age, parity, histological type and stage of the disease.

As a result, prompt diagnosis is necessary for the viability of the torsioned adnexal structure especially in young females at the reproductive ages because adnexa sparing could be performed in still viable organs. Clinical findings, presence of adnexial mass at ultrasonographic analysis, abnormal color Doppler sonography findings must alert a physician to this entity. The operation that will be performed must be planned according to age, fertility status, intraoperative gross pathology in tumor and malignant potential. Laparoscopic surgery is gaining popularity due to less postoperative morbidity.

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