DOI: 10.5350/BTDMJB201107401

The Management of Adnexal Torsion: Ovaries can be Saved By Early Diagnostic Laparoscopy and Detorsion

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ÖZET

Adneksiyel torsiyon yönetimi: Overler erken diagnostik laparoskopi ve detorsiyon ile korunabilir

Amaç: Adneksial torsiyon olgularında laparoskopi ve laparatomi olgularının değerlendirilmesi

Gereç ve Yöntem: İki yıl içerisinde adneksiyel torsiyon tanısı ile opere edilen hastalar retrospektif olarak değerlendirildi. Yaş, gravida, parite, adneksial kitlenin boyutu, semptomların başlamasından operasyona kadar geçen süre, uygulanan cerrahi yöntem ve hastanede kalış süreleri laparoskopi ve laparotomi uygulanan olgularda karşılaştırıldı.

Bulgular: Hastalardan on tanesine laparoskopi diğer 18 hastaya laparotomi uygulandı. Pelvik ağrı en sık gözlenen semptomdu. Hastalardan %58.1'inde pelvik ağrı sağda lokalizeydi. Hastaların yaş ortalaması laparoskopi grubunda 21.1±5.9 laparatomi grubunda 28.2±9.1 yıl olarak tespit edildi ($p<0.05$). Hastanede kalış süresi laparoskopi grubunda daha kısaydı (laparoskopi grubunda 1.9±1.2 gün, laparatomi grubunda 2.9±1.2gün), ($p<0.05$). Semptomların başlangıcından operasyona kadar geçen süre laparoskopi grubunda 6.3±2.5 saat, laparatomi grubunda ise11.7±4.1 saat olarak gözlendi ($p<0.05$). Dopplerde akım kaybı hastaların %46.4'ünde tespit edilebildi. Onbir hastaya salpingo-ooforektomi (%39.3), 16 (%57.1) hastaya ise detorsiyon uygulandı. Detorsiyon işlemi laparoskopi grubunda 9, laparatomi grubunda ise 7 hastada başarılı oldu. Bir olguda saptanan izole tuba torsiyonuna salpenjektomi yapıldı. Dört olguda gebelik mevcuttu. Detorsiyon bu hastalardan birinci ve ikinci trimester gebelikleri olmak üzere iki tanesinde (bir olguda laparoskopi ile) uygulanabildi.

Sonuç: Adneksiyel torsiyondan şüphelenildiğinde kesin tanı ancak cerrahi olarak konulabilir. Laparoskopi için hazırlıklar hızla yapılmalıdır. Tedavi adneksin nekroze görünümde bile olsa detorsiye edilmesi üzerine dayanmalıdır. Laparoskopi uygulanan hastalarda hastanede kalış süresi daha kısa olup detorsiyon oranı yüksektir.

Anahtar kelimeler: Adneksiyel torsion, laparoskopi, laparatomi

ABSTRACT

The management of adnexal torsion: Ovaries can be saved by early diagnostic laparoscopy and detorsion

Objective: To determine the surgical results of laparoscopy and laparatomy in patients with adnexal torsion.

Material and Methods: Twenty-eight patients with diagnosis of adnexal torsion in a period of two years were included in this retrospective analysis. Data regarding age, gravida, parity, size of the adnexal mass, delay between the first symptoms and the surgical procedure, the outcome of the operation and the duration of hospitalization were recorded and compared between the patients who had laparoscopy and those who had laparotomy.

Results: Ten of the patients were managed by laparoscopy while 18 patients had laparotomy. The most frequent presenting symptom was pelvic pain. In 58.1% of the cases pain was located at the right side. The mean age of the patients was 21.1±5.9 years at the laparoscopy group and 28.2±9.1 years at the laparotomy group ($p<0.05$). The mean duration of hospital stay was shorter in the laparoscopy group [1.9±1.2 versus 2.9±1.2 days respectively] ($p<0.05$). Median delay between the first symptoms and the surgical procedure were 6.3±2.5 hours and 11.7±4.1 hours at the laparoscopy and the laparotomy groups respectively ($p<0.05$). Velocity loss in Doppler ultrasonography was noted in 46.4% of the patients. Salpingo-oophorectomy was performed in 11 (39.3%) of the cases and detorsion in 16 (57.1%) of cases. Detorsion of the ovaries were successful at 9 cases with laparoscopy and 7 cases with laparotomy. There was one case of isolated fallopian tube torsion managed by laparoscopic salpingectomy. The total number of pregnant cases was four. Detorsion was successful in two of the cases (one by laparoscopy) at first and second trimester.

Conclusion: When adnexal torsion is suspected, the diagnosis can only be achieved by surgery. Arrangements should be made for laparoscopy as soon as possible. Treatment is essentially based on detorsion of the adnexa; even it has a necrosed appearance. Patients who had laparoscopy have a short duration of hospital stay with a high rate of detorsion.

Key words: Adnexal torsion, laparoscopy, laparatomy

Bakırköy Tıp Dergisi 2011;7:125-129

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Geliş tarihi / *Date of receipt:* 30 Haziran 2011 / June 30, 2011

Kabul tarihi / *Date of acceptance:* 25 Kasım 2011 / November 25, 2011

INTRODUCTION

Adnexal torsion is defined as the twisting by at least one complete turn of the adnexa, ovary, or more rarely the tube alone, around a centre-line consisting of the infundibulopelvic ligament and tubo-ovarian ligament (1). It is a severe gynecologic emergency with a yearly probably underestimated prevalence of 2.7% to 3.0% (1,2,3). Prompt diagnosis and surgery may prevent irreversible adnexal damage, but adnexal torsion remains one of the most challenging diagnosis in the emergency room. The clinical symptoms of adnexal torsion are nonspecific. Adnexal torsion occurs most often in adolescent girls and in women of childbearing age, nearly all of whom desire future fertility (4). Delay in diagnosis and treatment of this condition may therefore have grave consequences, resulting in functional loss of the ovary. The ultrasonographic appearance of adnexal torsion varies according to the duration and degree of torsion, complete or incomplete, and the presence or absence of an ovarian mass (5,6). Sonographic findings that have been previously described as predictors of adnexal torsion include the appearance of a cystic, solid, or complex mass at the adnexal location that is cranial to the uterine fundus, thickening of the adnexal wall, unilateral ovarian enlargement with multiple peripherally located follicles, cystic hemorrhage, and free pelvic fluid (7-10). Although the Doppler studies have been reported as a promising tool for the diagnosis (11-15), the investigators recommended that Doppler flow studies should not delay surgical exploration in the setting of suggestive signs and symptoms. Despite 20 years of research, the accuracy of the preoperative diagnosis of adnexal torsion remains low (1). The urge to operate can be attributed to the importance of preserving ovarian function in young women as well as to the availability and the low associated complication rate of laparoscopy. The aim of this study was to determine the effect of the time period between the beginning of the first symptoms and surgical procedure on the feasibility of detorsion of the ovary.

MATERIAL AND METHODS

We have performed a computerized database search for cases of ovarian torsion operated in our institution between January 2008 and December 2010. Data relating to demographic factors, clinical findings, preoperative ultrasound scans, and time from admission to surgery, operative reports were retrospectively retrieved from the medical records. All patients included in the current study were managed by surgery, and all had intraoperative confirmation of ovarian torsion.

The preoperative ultrasound scans were performed by an experienced radiologist with different ultrasonographic machines from various manufacturers, all equipped with a transvaginal probe (5-7.5 MHz frequency with a focal range of 6 cm from the transducer tip) and a transabdominal probe (3.5 to 5 MHz frequency).

The ultrasound images of the twisted ovaries were analyzed and were classified according to the size of the adnexal mass. The Doppler findings were also reported as absent or present wave forms. Presence of ascites was also reported. All the surgeons who had performed the operations were trained for laparoscopic surgery and all of the cases were preoperatively considered for the feasibility of the laparoscopic management. Decision for adnexal detorsion was evaluated in all of the patients.

The data were compared between the patients who had laparoscopy and those who had laparotomy. Statistical analyses were performed using SPSS 16 statistical software. Categorical variables are presented as percentage and continuous variables are presented as mean standard deviation. Comparison of categorical variables was performed by chi-square test. $P<0.05$ was considered statistically significant.

RESULTS

Ten of the patients were treated by laparoscopy, while 18 patients had laparotomy. The most frequent presenting symptom was pelvic pain. In 58.1% of the cases pain was located at the right side. Age of the patients was between 15-46 years. The mean age of the patients was 21.1±5.9 years at the laparoscopy group and 28.2±9.1 years at the laparotomy group ($p<0.05$). The mean duration of hospital stay was shorter in the laparoscopy group [1.9±1.2 days versus 2.9±1.2 days respectively] ($p<0.05$). The time period between the first symptoms and surgical procedure were 6.3±2.5 hours and 11.7±4.1 hours at the laparoscopy and the laparotomy groups respectively ($p<0.05$). Sizes of the adnexal masses were 5-10 cm in 19 (67.9%) and >10cm in 9 (32.1%) of the patients. Velocity loss in Doppler ultrasonography was

Table 1: The demographic variables and the surgical outcomes of the patients treated with laparoscopy or laparatomy in relation with the size of the adnexal torsion.

	Laparoscopy			Laparotomy			Significance
Age	21.1±5.9 years			28±9.1years			p<0.05
Parity	1.2±0.9			0.6±0.7			p<0.05
Duration of hospitalization	1.9±1.2 days			2.9±1.3 days			p<0.05
Delay	6.3±2.5 hours			11.7±4.1 hours			p<0.05
Size	n:10	Detorsion applicable	Detorsion Not applicable	n:18	Detorsion applicable	Detorsion Not applicable	
5-10 cm	9	9 (32.1%)	-	10	6 (21.4%)	4 (14.3%)	p>0.05
>10cm	1	-	1 (3.6%)	8	1 (3.6%)	7 (25%)	p>0.05

noted in 46.4% of the patients. Salpingo-oophorectomy was performed in 11 (39.3%) of the cases and detorsion in 16 (57.1%) of cases. Detorsion of the ovaries were successful in nine cases with laparoscopy and seven cases with laparotomy. Detorsion of the ovaries could be managed in 15 (79%) of the cases with ovaries 5-10 cm diameter and 1 case (11%) with ovary >10 cm while salpingo-oophorectomy was performed in 8 cases (89%) with ovaries >10 cm and 4 cases (21%) with ovaries of 5-10 cm in diameter. There was one case of isolated fallopian tube torsion managed by laparoscopic salpingectomy. The mean age of the patients were 22.4±5.8 and 29.7±10.23 in patients treated conservatively by the detorsion of the adnexal and the patients treated by salpingo-oophorectomy respectively (p>0.05). Mean parity was also low (0.56±0.7 vs. 1.17±0.9) in patients treated conservatively by the detorsion of the adnexal compared with the patients treated by salpingo-oophorectomy respectively (p>0.05) (Table 1). The total number of pregnant cases was 4. Detorsion was successful in two of the cases (one by laparoscopy) at first and second trimester.

DISCUSSION

At the present time, there is no reliable method to confirm the diagnosis of adnexal torsion pre-operatively. The advantage of early diagnosis of adnexal torsion is prevention of complications. If the diagnosis is not made; the adnexa or ovary may be lost, with subsequent fertility problems (1). More rarely, delay or mistaken diagnosis may be responsible for potentially fatal thrombophlebitis or peritonitis (1,2,16-23). The right side is most frequently affected (67-71%) in cases of adnexal torsion. Similar with the literature; the torsion of the adnexa were at the right side in 58.1% of cases. This may be explained by the fact that the right utero-ovarian ligament is physiologically longer than the left, or by the presence of the sigmoid on the left which reduces the space needed for torsion to occur (21,24). The Doppler effect in sonography has been studied and various studies disagree as to how useful it is (11-15). According to Pena et al. 60% of the cases of torsion are missed by Doppler, while its positive predictive value was 100 (21). We have also found velocity loss in Doppler ultrasonography in only 46.4% of the patients. So we also believe that normal Doppler result can not exclude the diagnosis of adnexal torsion and surgical procedures should not be delayed in the presence of suspicious signs and symptoms.

Laparoscopy allows the definite diagnosis of adnexal torsion to be made as a first step (25,26). The second step can be the treatment of the adnexal torsion (27-29). Cohen et al. made a retrospective comparison of laparoscopy and laparotomy or the treatment of 102 torsions (30). None of the patients have had post-operative thromboembolic complications. There was no significant difference between the two groups neither in ovarian function nor in the macroscopic appearance of the ovaries when secondary surgery took place. The only difference between the two groups was that the hospital stay was shorter in the case of laparoscopy (2.1 days vs. 7.4 days; p<0.001). In our study we have also had no thromboembolic complications. Although the hospital stay for the laparotomy group is shorter than the laparotomy group in the for mentioned study, there was

still a significant difference between the patients that were treated with laparoscopy or laparotomy.

Conservative treatment consists of detorsion the adnexa, potentially followed by a procedure with no adverse effect on fertility: puncture of a cyst or intra-peritoneal cystectomy (31,32). The main hesitation concerning conservative treatment consists of the theoretical fear of thromboembolic complications secondary to untwisting of ischemic adnexa. However, the incidence of pulmonary embolism in case of adnexal torsion is 0.2% (1). This incidence is no greater after the detorsion (33). No increase in the number of thromboembolic complications after untwisting is evident from the literature (30,34). As a general rule, those authors carried out adnexectomy when the adnexa appeared necrotic or did not return to a viable-looking appearance after untwisting ischemic adnexa (1,2,35). However several studies showed poor assessment of adnexal necrosis by the surgeon (36,37) Furthermore, some studies found that simply untwisting the adnexa allowed ovarian function to return in patients presenting adnexa that appeared to be necrotic (38,39) Ovarian function is preserved in 88-100% of adnexal torsion assessed at a later date (25,30,40,41). When we compare our cases treated by salpingo-oophorectomy with the cases treated by conservative surgery; we have observed that eight out of nine cases managed with salpingo-oophorectomy had a size >10cm diameter, while only four out of 19 cases with the size 5-10 cm diameter had salpingo-oophorectomy. The age and the parity of the patient may also be a confounding factor in the decision of the conservative treatment as the patient treated conservatively were younger and had lower parity in comparison with the patient treated with salpingo-oophorectomy.

Although a short delay of several hours is considered by many authorities not detrimental to the future viability of the ovary we believe that early surgical intervention is detrimental for the preservation of the ovarian function especially in young women desiring for future fertility (1). Busy operating rooms, patient refusal to undergo emergency operation during the night hours, need to stabilize patients with additional systemic disease, anesthesiologist's, request for a full 6-hour fast, and surgeon's allowing a delay due to low clinical suspicion may be the various cause of delay in surgical diagnoses. In a recent study by Bar-on et al, the preoperative diagnosis of ovarian torsion was confirmed in only 36 (46.1%) of the patients treated with early laparoscopy (42). Despite the findings in the for mentioned study early surgical intervention is detrimental for the preservation of the ovarian function and. early laparoscopy is the treatment of choice depending on the patients systemic status, anesthesiologist and the operating room conditions. Early decision making for surgery can also facilitate the willingness of the surgeon for laparoscopy as a delayed case with enlarged ovaries may lead the surgeon to perform laparatomy.

The diagnosis of adnexal torsion can only be achieved by surgery. Arrangements should be made for laparoscopy as soon as possible. Treatments essentially based on detorsion of the adnexa; even it has a necrosed appearance. Laparocopicaly managed patients have a short duration of hospital stay with a high rate of detorsion.

REFERENCES

1. Huchon C, Fauconnier A. Adnexal torsion: a literature review. Eur J Obstet Gynecol Reprod Biol 2010; 150: 8-12.
2. Hibbard LT. Adnexal torsion. Am J Obstet Gynecol 1985; 152: 456-461.
3. Taskin O, Birincioglu M, Aydin A, Buhur A, Burak F, Yilmaz I. The effects of twisted ischaemic adnexa managed by detorsion on ovarian viability and histology: an ischaemia-reperfusion rodent model. Hum Reprod 1998; 13: 2823-2827.
4. Haskins T, Shull B. Adnexal torsion: a mind-twisting diagnosis. South Med J 1986;79:576-577.
5. Rosado WM Jr, Trambert MA, Gosink BB, Pretorius DH. Adnexal torsion: diagnosis by using Doppler sonography. Am J Roentgenol 1992; 159: 1251-1253.
6. Fleischer AC, Stein SM, Cullinan JA,Warner MA. Color Doppler sonography of adnexal torsion. J Ultrasound Med 1995; 14: 523-528.
7. Shadinger LL, Andreotti RF, Kurian RL. Preoperative sonographic and clinical characteristics as predictors of ovarian torsion. J Ultrasound Med 2008; 27: 7-13.
8. Chang HC, Bhatt S, Dogra VS. Pearls and pitfalls in diagnosis of ovarian torsion. Radiographics 2008; 28:1355-1368.
9. Graif M, Shalev J, Strauss S, Engelberg S, Mashiach S, Itzchak Y. Torsion of the ovary: sonographic features. AJR 1984; 143: 1331-1334.
10. Smorgick N, Maymon R, Mendelovic S, Herman A, Pansky M. Torsion of normal adnexa in postmenarcheal women: can ultrasound indicate an ischemic process? Ultrasound Obstet Gynecol 2008; 31: 338-341.

11. Ben-Ami M, Perlitz Y, Haddad S. The effectiveness of spectral and color Doppler in predicting ovarian torsion. A prospective study. Eur J Obstet Gynecol Reprod Biol 2002; 104: 64-66.

12. Albayram F, Hamper UM. Ovarian and adnexal torsion: spectrum of sonographic findings with pathologic correlation. J Ultrasound Med 2001; 20: 1083-1089.

13. Desai SK, Allahbadia GN, Dalal AK. Ovarian torsion: diagnosis by color Doppler ultrasonography. Obstet Gynecol 1994; 88: 699-701.

14. Lee EJ, Kwon HC, Joo HJ, Suh JH, Fleischer AC. Diagnosis of ovarian torsion with color Doppler sonography: depiction of twisted vascular pedicle. J Ultrasound Med 1998; 17: 3-9.

15. Van Voorhis BJ, Schwaiger J, Syrop CH, Chapler FK. Early diagnosis of ovarian torsion by color Doppler ultrasonography. Fertil Steril 1992; 58: 215-217.

16. Willms AB, Schlund JF, Meyer WR. Endovaginal Doppler ultrasound in ovarian torsion: a case series. Ultrasound Obstet Gynecol 1995; 5: 129-132.

17. Bayer AI, Wiskind AK. Adnexal torsion: can the adnexa be saved. Am J Obstet Gynecol 1994; 171: 1506-1511.

18. Nichols DH, Julian PJ. Torsion of the adnexa. Clin Obstet Gynecol 1985; 28: 375-380.

19. Havlik DM, Nolte KB. Sudden death in an infant resulting from torsion of the uterine adnexa. Am J Forensic Med Patol 2002; 23: 289-291.

20. Delvigne A, Rozenberg S. Review of clinical coures and treatment of ovarian hyperstimulation syndrome (OHSS). Hum Reprod Update 2003; 9: 77-96

21. Pena JE, Ufberg D, Cooney N, Denis AL. Usefulness of Doppler sonography in the diagnosis of ovarian torsion. Fertil Steril 2000; 73: 1047-1050.

22. Oelsner G, Shashar D. Adnexal torsion. Clin Obstet Gynecol 2006; 49: 459-463.

23. Ozcan C, Celik A, Ozok G, Erdener A, Balik E. Adnexal torsion in children may have a catastrophic sequel: asynchronous bilateral torsion. J Pediatr Surg 2002; 37: 1617-1620.

24. Warner MA, Fleischer AC, Edell SL, et al. Uterine adnexal torsion: sonographic findings. Radiology 1985; 154: 773-775.

25. Mage G, Canis M, Mahnes H, Pouly JL, Bruhat MA. Laparoscopic management of adnexal torsion. A review of 35 cases. J Reprod Med 1989; 34: 520-524.

26. Porpora MG, Gomel V. The role of laparoscopy in the management of pelvic pain in women of reproductive age. Fertil Steril 1997; 68: 765-79.

27. Argenta PA, Yeagley TJ, Ott G, Sondheimer SJ. Torsion of the uterine adnexa. Pathologic correlations and current management trends. J Reprod Med 2000; 45: 831-836.

28. Reich H, DeCaprio J, Mc Glynn F, Taylor J. Laparoscopic diagnosis and management of acute adnexal torsion. Gynaecol Endosc 1992; 2: 37-38.

29. Wang PH, Yuan CC, Chao HT, Shu LP, Lai CR. Isolated tubal torsion managed laparoscopically. J Am Assoc Gynecol Laparosc 2000; 7: 423-427.

30. Cohen SB, Wattiez A, Seidman DS, et al. Laparoscopy versus laparotomy for detorsion and sparing of twisted ischemic adnexa. JSLS 2003; 7: 295-299.

31. Decadt B, Sussman L, Lewis MP, et al. Randomized clinical trial of early laparoscopy in the management of acute non-specific abdominal pain. Br J Surg 1999; 86: 1383-1386.

32. Gocmen A, Karaca M, Sari A. Conservative laparoscopic approach to adnexal torsion. Arch Gynecol Obstet 2008; 277: 535-538.

33. McGovern PG, Noah R, Koenigsberg R, Little AB. Adnexal torsion and pulmonary embolism: case report and review of the literature. Obstet Gynecol Surv 1999; 54: 601-638.

34. Oelsner G, Bider D, Goldenberg M, Admon D, Mashiach S. Long-term follow-up of the twisted ischemic adnexa managed by detorsion. Fertil Steril 1993; 60: 976-979.

35. Descargues G, Tinlot-Mauger F, Gravier A, Lemoine JP, Marpeau L. Adnexal torsion: a report on forty-five cases. Eur J Obstet Gynecol Reprod Biol 2001; 98: 91-96.

36. Mazouni C, Bretelle F, Menard JP, Blanc B, Gamerre M. Diagnosis of adnexal torsion and predictive factors of adnexal necrosis. Gynecol Obstet Fertil 2005;33 (3):102–6.

37. Steyaert H, Meynol F, Valla JS. Torsion of the adnexa in children: the value of laparoscopy. Pediatr Surg Int 1998;13: 384-387.

38. Eckler K, Laufer MR, Perlman SE. Conservative management of bilateral asynchronous adnexal torsion with necrosis in a prepubescent girl. J Pediatr Surg 2000; 35: 1248-1251.

39. Shalev E, Bustan M, Yarom I, Peleg D. Recovery of ovarian function after laparoscopic detorsion. Hum Reprod 1995; 10: 2965-2966.

40. Levy T, Dicker D, Shalev J, et al. Laparoscopic unwinding of hyperstimulated ischaemic ovaries during the second trimester of pregnancy. Hum Reprod 1995; 10: 1478-1480.

41. Pansky M, Abargil A, Dreazen E, Golan A, Bukovsky I, Herman A. Conservative management of adnexal torsion in premenarchal girls. J Am Assoc Gynecol Laparosc 2000; 7: 121-124.

42. Bar-On S, Mashiach R, Stockheim D, et al. Emergency laparoscopy for suspected ovarian torsion: are we too hasty to operate? Fertil Steril 2010; 93: 2012-2015.