

Prevalence of diastasis recti abdominis in the population of young multiparous adults in Turkey

Częstość występowania rozejścia mięśni prostych brzucha w populacji młodych wieloródek w Turcji

Turan Volkan, Colluoglu Cagdas, Turkyilmaz Esengul, Korucuoglu Umit,

Mus Obstetrics and Gynecology Hospital, Mus, Turkey

Abstract

Objectives: To determine the prevalence and factors associated with diastasis recti abdominis (DRA)

Material and Methods: Between January 2011 and May 2011, we examined 95 patients, aged between 19-24, for the presence of DRA during an ultrasonographic exploration in Mus Obstetrics and Gynecology Hospital, Mus, Turkey. DRA was graded by the number of fingerbreadths between the medial edges of the bellies of the rectus abdominis muscle, 3-4 cm above the umbilicus. The exclusion criteria included urogynecologic problems since childhood, excessive protrusion of the vagina due to loss of support, pregnancy, obesity, less than 6 months postpartum. The relationship between DRA and parity, previous abdominal surgery, pelvic relaxation as well as type of parity was assessed.

Results: Positive correlation was found between parity and DRA ($r=0.77$; $p<0.001$). Although there was no significant difference between DRA and the type of delivery among primiparous patients ($p=0.556$), DRA increased significantly in the second cesarean section patients ($p=0.004$). In this trial, cystocele and rectocele were established in 57% and 43% of patients with DRA, while descensus uteri was present in 10 (52%) patients.

Conclusions: Increased parity and recurrent abdominal surgery seem to increase the risk of DRA. However; the importance of DRA in the young women remains unknown.

Key words: **diastasis recti abdominis / multiparity / pelvic floor dysfunction /**

Corresponding author: :

Volkan Turan
Department of Gynecology and Obstetrics, Mus, Turkey
Postal code: 49100, Mus, Turkey
Phone Number: 905059113736
volkanturan@yahoo.com

Otrzymano: 30.08.2011
Zaakceptowano do druku: 25.09.2011

Streszczenie

Cel pracy: Ocena częstości występowania i czynników ryzyka rozejścia mięśni prostych brzucha (DRA).

Materiał i metody: W okresie od stycznia 2011 do maja 2011 zbadano 95 pacjentek, w wieku 19-24 lat, pod kątem obecności DRA przy pomocy ultrasonografii w Szpitalu Ginekologiczno-Położniczym w Mus w Turcji. DRA klasyfikowano na podstawie liczby palców pomiędzy brzegami mięśnia prostego brzucha, 3-4cm powyżej pępka. Kryteria wykluczenia stanowiły schorzenia uroginekologiczne w dzieciństwie, wypadanie pochwy w związku z utratą podpory, ciążą, otyłością oraz okres do 6 miesięcy od porodu. Oceniano związek pomiędzy DRA a rodnością, rodzajem porodów, poprzednimi operacjami brzuszными oraz rozluźnieniem miednicy.

Wyniki: Znalaziono związek pomiędzy rodnością a DRA ($r=0,77$; $p<0,001$). Choć nie znalaziono istotnych różnic pomiędzy DRA a typem porodu u pierwiastek ($p=0,556$), to jednak zaobserwowano znaczny wzrost tego schorzenia w przypadkach drugiego cięcia cesarskiego ($p=0,004$). W naszym badaniu oszacowano częstość występowania cystocele i rectocele na 57% i 43% u pacjentek z DRA, podczas gdy wypadanie macicy występowało u 10 (52%) pacjentek.

Wnioski: Zwiększona rodność i kolejne operacje brzuszne wydają się zwiększać ryzyko wystąpienia DRA, jakkolwiek waga tego zjawiska u młodych kobiet pozostaje nieznana.

Słowa kluczowe: **rozejście mięśni prostych brzucha / wielorództwo /
/ dysfunkcja dna miednicy mniejszej /**

Introduction

Diastasis recti abdominis (DRA) is a separation between the left and right side of the rectus abdominis muscle, which covers the front surface of the belly area. It is commonly detected as a normal condition in newborns and seen most frequently in premature and African American infants. This condition can be diagnosed by physical examination, and must be differentiated from hernias [1].

Due to close relationship between the pelvic floor and abdominal muscles, performance of the pelvic floor muscles could be affected by a decrease in abdominal muscle function associated with DRA [2]. Urinary incontinence, fecal incontinence and pelvic organ prolapse occur with the loss of the support-related functions of the pelvic floor muscles [3, 4, 5]. DRA may play an important role in the development, persistence and recurrence of conditions related to impairments of the pelvic floor region. Reported improvement of urinary incontinence after abdominoplasty confirms this hypothesis [6].

In the present study the authors aimed to determine the prevalence and factors that were associated with diastasis recti abdominis and to compare the results with gynecologic examination, in particular the assessment of pelvic floor relaxation in young adult population.

Material and methods

Between January 2011 and May 2011, 95 patients of Mus Obstetrics and Gynecology Hospital, Mus, Turkey, aged between 19-24, were examined for the presence of DRA. All patients were divided into nulliparous (controls) ($n=19$), primiparous ($n=39$) and multiparous (two births) ($n=37$) groups. Most of these patients had come to the gynecology polyclinic because of vaginal discharge due to bacterial or mycotic infection. All patients underwent gynecological examination (speculum and bimanual vaginal assessment) and then they were investigated for the presence of cystocele, rectocele and descensus uteri. POP-Q system (Classification of pelvic organ prolapse) was used for staging [7].

After the ultrasonographic exploration, all patients were tested for the presence of DRA while supine with the hips and knees flexed and feet flat on the support surface. After lifting the patient's head and shoulders off the table with arms extended toward the knees, DRA was graded by the number of fingerbreadths (approximately 1.5cm per fingerbreadth) between the medial edges of the bellies of the rectus abdominis muscle, 3-4cm above the umbilicus [8]. (Figure 1).

Any separation of 2cm or less was considered normal; greater than 2 cm widths constituted a diastasis recti abdominis.

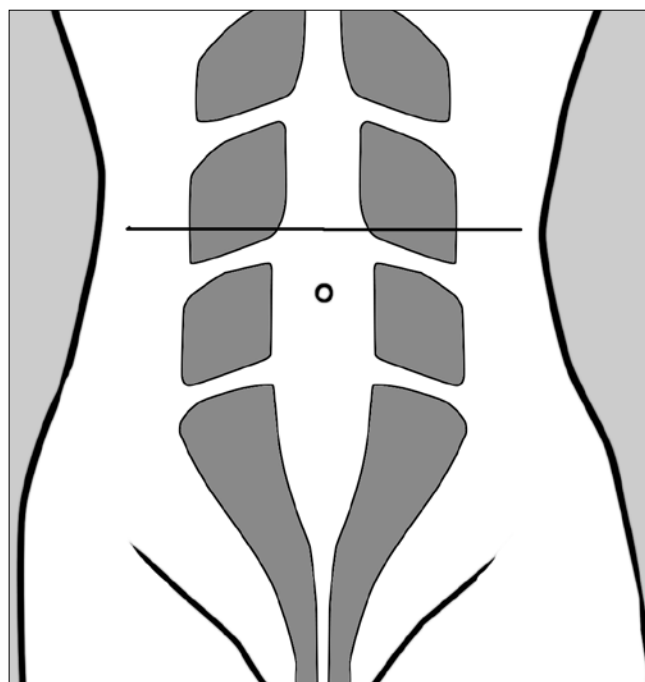


Figure 1. Inter-recti distance was measured 3-4 cm above umbilicus.

Prevalence of diastasis recti abdominis in the population of young multiparous adults in Turkey.

Table I. The distribution of all patients according to the number of fingerbreadths (1.5cm per fingerbreadth).

n=95	ABSENT			PRESENT			
	0	0.5	1	1.5	2	2.5	3
Number of fingerbreadths	0	0.5	1	1.5	2	2.5	3
Diastasis recti abdominis	18	29	25	8	9	4	2

Table II. The relationship between type of parity and DRA (After the primiparous and multiparous patients were divided as vaginal or cesarean delivery, inter recti distance were compared).

Results were given as mean \pm standard deviation.
Difference were considered significant at $p < 0.05$ level.
DRA – Diastasis Recti Abdominis

n=76	Vaginal delivery	Cesarean	P value
Primiparous (n=39)	0.94 \pm 0.34 cm	1.0 \pm 0.36 cm	P=0.556
Multiparous (n=37)	1.8 \pm 0.78 cm	2.8 \pm 1.01 cm	P=0.004

The exclusion criteria included urogynecologic problems since childhood, excessive protrusion of the vagina due to loss of support, pregnancy, obesity, less than 6 months after delivery, smoking and chronic cough. The relationship between DRA and parity, previous abdominal surgery as well as type of parity, was assessed and compared with pelvic relaxation findings.

Statistics

Student t test and Pearson's correlation test were used for statistical analyses. $p < 0.05$ was considered statistically significant. Results were given as mean \pm standard deviation. All statistical analyses were performed using SPSS Version 15.

Results

Mean age of all patients in this study was 22.04 \pm 1.29 years. 4 out of 95 patients had a history of abdominal surgery (1 ectopic pregnancy, 2 appendectomy and 1 ovarian cyst extirpation). Mean inter recti distance of patients that had undergone previous surgery was 2,62 \pm 0,96cm and 3 out of 4 had DRA.

Positive correlation was established between parity and DRA ($r=0,77$; $p < 0,001$). Twenty-three patients in this trial were diagnosed with DRA (24%) and inter-recti distance was measured according to their parity (0.15 \pm 0.4cm, 0.98 \pm 0.35cm and 2.35 \pm 1.01cm respectively in control, primiparous and multiparous group). (Figure 2).

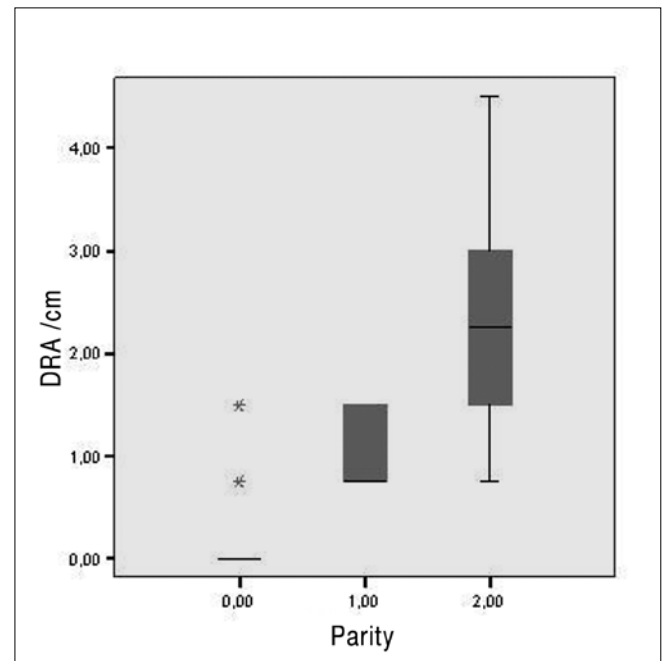


Figure 2. The relationship between parity and DRA.
(0 – had never been pregnant, 1 – had delivered once, 2 – had delivered twice)
DRA – Diastasis Recti Abdominis.

Table III. Patients characteristics. Results were given as mean \pm standard deviation.

n=95	Control group (n=19)	Primiparous patients (n=39)	Multiparous patients (n=37)
Age (years)	21.2 \pm 2.2	21.5 \pm 1.2	22.9 \pm 0.75
Body mass index (g/cm ²)	21.1 \pm 1.19	21.8 \pm 1.10	21.9 \pm 1.18
Previous abdominal surgery	1/19	1/39	2/37
Type of delivery			
Vaginal delivery		19/39	19/39
Cesarean		20/39	18/39
Presence of diastasis recti	0/19	1/39 (2%)	22/37 (59%)
Distance between rectus abdominis bellies	0.15 \pm 0.4	0.98 \pm 0.35	2.35 \pm 1.01
Cystocele		11/39	22/37
Rectocele		8/39	12/37
Descensus Uteri		7/39	12/37

While DRA was not detected in nulliparous group, it was present in 2% of primiparous and 59% of multiparous patients.

According to the number fingerbreadths, the distribution of patients was shown in Table I.

The comparison of patients in terms of delivery type resulted in an insignificant result for patients that gave birth once ($p=0.556$), however, the difference was significant for patients that gave birth twice ($p=0.004$). (Table II, Figure 3).

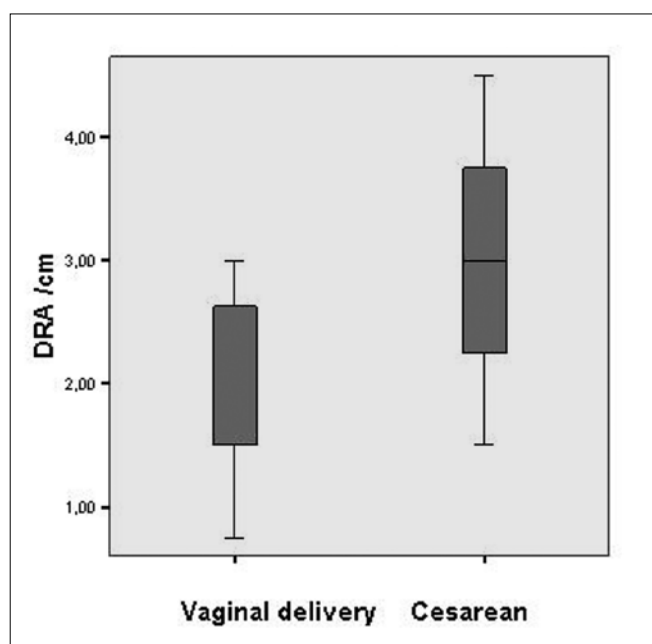


Figure 3. The comparison of patients that gave birth twice in terms of the relation between type of delivery and DRA.
DRA – Diastasis Recti Abdominis.

After vaginal examination, cystocele, rectocele and descensus uteri were found in 33, 20 and 19 patients, respectively. 19 out of 33 patients (57%) with cystocele, 10 out of 20 patients (50%) with rectocele and 10 out of 19 patients (52%) with descensus uteri (two of them were stage 2) had DRA. The patients did not report any types of incontinence. Characteristics and gynecologic examination findings of patients were shown in Table III.

Discussion

Mus is a city in the southeastern part of Turkey, with a population of 500.000. Low socio-economical level, marriage at an early age, absence of family planning methods and the fact that tubal ligation and pregnancy termination, even in case of fetal anomalies, are not acceptable due to religious reasons, are the causes of numerous multiparity cases in very young adult women and make it easier to carry out this study.

Rectus abdominis muscle separation in the midline at the linea alba is defined as diastasis recti but whether it is a pathologic condition or a natural part of aging remains unknown. Hormonal and biochemical changes during pregnancy may be predisposing factors for this condition [9]. DRA may result in low back pain, respiratory and posture problems, as well as pelvic relaxation symptoms.

Boissonnault JS et al. [10] investigated the incidence of diastasis recti abdominis among 71 primiparous women during the childbearing year. According to this study, DRA was observed initially in the women in the second trimester group. Its incidence increased in the third trimester group; remained high in the women in early postpartum group; and declined in the later postpartum group. To increase the reliability of the present study, all included patients were 6 months postpartum or more.

It has been reported that there is a relationship between the presence of DRA and the diagnosis of stress urinary incontinence, fecal incontinence, and pelvic organ prolapse. Spitznagle TM et al. [11] reported that two hundred and eighty-one out of the 541 examined patients (52%) presented with DRA. Mean age of all patients in their trial was 52 years. The patients with DRA were older, reported higher parity and gravity levels, and had weaker pelvic floor muscles than the patients without DRA. Also, race (Asian and Caucasian), menopause, hormone replacement therapy as well as abdominal surgery were reported as risk factors in that trial. According to the present study, multiparity was found to be a risk factor for DRA. Moreover, cesarean section patients are at higher risk of DRA when compared with vaginal delivery. In nulliparous patients, DRA was not detected. Although DRA impairment has not been reported before in nulliparous patients, DRA may occur in these patients because of having jobs or illnesses that increase intra-abdominal pressure.

Although the importance of DRA remains unknown, prevention is possible. Physical exercises before or during pregnancy help make abdominal muscles stronger and DRA may not develop. Future studies, with long-term follow up including the division of the patients divided into exercise and non-exercise groups, may offer more information about the presence and occurrence of DRA.

Insufficient or lack of data about the duration of labor, fetal weights, usage of vacuum or forceps and muscle traumas during cesarean is a limitation of the present study. Also, new studies should be done in the future to determine whether DRA proceeds with advanced age and to what extent it contributes to pelvic dysfunctions. The question can be answered if the same patients are followed for a longer period of time.

The inter-rectal distance and abdominal muscle function of postpartum women improved but did not return to normal the value until 6 months postpartum. Time during which rectus muscle returns to its normal value after delivery remains to be a controversial issue according to the previous studies [12].

In the present study, we included patients who delivered at least 6 months prior to the study, nevertheless it may have caused errors in the calculation of inter-rectal distance.

In conclusion, although DRA does not seem to have any effect in the young women, it may cause urogynecologic problems in the future due to advancing age, increasing BMI, parity and abdominal surgery. These patients may probably be included in the future studies as they are the most likely candidates for pelvic relaxation after menopause.

The authors declare no conflict of interest.

Prevalence of diastasis recti abdominis in the population of young multiparous adults in Turkey.

KOMUNIKAT

Acknowledgments

The author wishes to thank Dr Timur Kose (Department of Biostatistics, Ege University, Izmir) for statistical analyses and Ozge Tosun (Physiotherapist, Department of Physical Therapy and Rehabilitation, Dokuz Eylul University, Izmir) for initial experience to measure inter-recti distance.

References

1. Critchley D. Instructing pelvic floor contraction facilitates transversus abdominis thickness increase during low-abdominal hollowing. *Physiother Res Int.* 2002, 7, 65-75.
2. Giljeard W, Brown J. Structure and function of the abdominal muscles in primigravid subjects during pregnancy and the immediate postbirth period. *Phys Ther.* 1996, 76, 750-762.
3. Delancey J. The pathophysiology of stress urinary incontinence in women and its implications for surgical treatment. *World J Urol.* 1997, 15, 268-274.
4. Jensen L. Fecal incontinence: evaluation and treatment. *J Wound Ostomy Continence Nurs.* 1997, 24, 277-282.
5. Barber M. Symptoms and outcome measures of pelvic organ prolapse. *Clin Obstet Gynaecol.* 2005, 48, 648-661.
6. Mast B. Alleviation of urinary incontinence after abdominoplasty. *Ann Plast Surg.* 1999, 42, 456-457.
7. Mouritsen L. Classification and evaluation of prolapse. *Best Pract Res Clin Obstet Gynaecol.* 2005, 19, 895-911.
8. Noble E Harwich M. Essential exercises for the childbearing year. 4th ed. *New Life Images.* 1995. paperback 227.
9. Noble E Harwich M. Essential exercises for the childbearing year. 2 ed. Boston, MA, Houghton Mifflin Co, 1982.58-63.
10. Boissonnault J, Blaschak M. Incidence of diastasis recti abdominis during the childbearing year. *Phys Ther.* 1988, 68, 1082-1086.
11. Spitznagle T, Leong F, Van Dillen L. Prevalence of diastasis recti abdominis in a urogynecological patient population. *Int Urogynecol J Pelvic Floor Dysfunct.* 2007, 18, 321-328.
12. Liaw L, Hsu M, Liao C, [et al.]. The relationships between inter-recti distance measured by ultrasound imaging and abdominal muscle function in postpartum women: a 6-month follow-up study. *J Orthop Sports Phys Ther*

Konferencja ginekologów i położników polskich



Kontrowersje
w położnictwie
i ginekologii

3-4 grudnia 2011 r.
Warszawa



Do
16 października
cena
promocyjna

Główne tematy konferencji:

- Poród przedwczesny
- Indukcja porodu
- Krwotoki łożnicze
- Postępowanie u kobiet z zespołem PCOS
- Skrining i leczenie raka jajnika
- Antykoncepcja doraźna i u młodocianych
- Rekomendacje sekcji USG PTG w zakresie diagnostyki ultrasonograficznej w położnictwie i ginekologii w ciąży o przebiegu prawidłowym

Komitet naukowy:

- Prof. dr hab. Jacek Brzęt – przewodniczący
- Prof. dr hab. Ewa Wender-Ożegowska
- dr hab. Marek Pietryga

Jednostki organizacyjne

- Klinika Położnictwa i Chorób Kobięcych Uniwersytetu Medycznego im. K. Marcinkowskiego w Poznaniu
- Sekcja Cukrzycy, Otyłości i Innych Chorób Metabolicznych Cięży Polskiego Towarzystwa Ginekologicznego
- Sekcja Ultrasonografii Polskiego Towarzystwa Ginekologicznego
- Wydawnictwo FORUM Sp. z o.o.

Więcej informacji na stronie

www.warszawa.forum-ginekologii.pl

Uczestnikom konferencji oprócz punktów edukacyjnych zostanie przyznanych 20 punktów do certyfikatu Sekcji Ultrasonografii Polskiego Towarzystwa Ginekologicznego.

**Biuro organizacyjne:**

Wydawnictwo FORUM Sp. z o.o.
ul. Polska 13, 60-595 Poznań
tel. 61 66 55 800, fax 61 66 55 888
infolinia@e-forum.pl