





# Do positional variations of epididymis affect infertility?

## *Epididimin pozisyonel varyasyonları infertiliteyi etkiler mi?*

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**Cite this article as:** Akınsal EC, Baydilli N, Demirtaş A, Ekmekçioğlu O. Do positional variations of epididymis affect infertility? Turk J Urol 2017; 44: DOI: 10.5152/tud.2018.60486.

### ABSTRACT

**Objective:** To determine the ratio of epididymal position variations and whether this had any effect on seminal parameters.

**Material and methods:** Scrotal examination results and epididymal positions were retrospectively assessed in subjects presenting to our clinic for infertility, varicocele, and sexual developmental delay. Scrotal examination consisted of epididymal position, testicular volumes, and vas deferens and varicocele presence. The subjects were categorized according to sperm counts per ml. Data were assessed whether there was a significant difference in terms of epididymal positions among the groups.

**Results:** A total of 5812 epididymides were examined. There was no significant difference with respect to one or two epididymides being in an anterior position between the groups allocated with respect to a sperm count above 15 million, between 5 and 15 million, and below 5 million ( $p=0.542$ ). Sperm counts and motility did not differ according to the position of the epididymis in analyzes performed separately within each group.

**Conclusion:** Positional variations of epididymis can be seen at a considerable rate. Nevertheless, there was no clear relationship between these variations and infertility. In terms of avoiding possible misdiagnoses and treatment complications possible epididymal position variations should be kept in mind during clinical practice.

**Keywords:** Epididymal position; infertility; variation.

### ÖZ

**Amaç:** Epididimal pozisyon varyasyonlarının oranını ve bunun seminal parametrelere herhangi bir etkisi olup olmadığını belirlemek.

**Gereç ve yöntemler:** İnfertilite, varikosel ve cinsel gelişmede gecikme nedeniyle kliniğimize başvuran olgularda skrotal muayene sonuçları ve epididim pozisyonları retrospektif olarak incelendi. Skrotal muayene epididimlerin pozisyonu, testislerin volümü, vas deferensin durumu ve varikosel olup olmaması durumlarını içermektedir. Olgular mililitredeki sperm sayılarına göre gruplara ayrıldı. Veriler gruplar arasında epididim pozisyonlarına göre farklılık olup olmadığı yönünde değerlendirildi.

**Bulgular:** Toplam 5812 epididim değerlendirildi. Sperm sayısına göre (15 milyon üzerinde, 5-15 milyon arasında ve 5 milyon altında) ayrılmış gruplar arasında bir veya iki epididimin anterior pozisyonunda olması açısından anlamlı fark yoktu ( $p=0.542$ ). Her grubun kendi içinde yapılan analizlerde de sperm sayı ve motiliteleri epididim pozisyonuna göre farklılık göstermiyordu.

**Sonuç:** Epididimin pozisyonel varyasyonları azımsanmayacak oranda görülmektedir, ancak bu durum ile infertilite arasında açık bir ilişki tespit edilememiştir. Olası yanlış tanı ve tedavi komplikasyonlarından kaçınma açısından, klinik uygulamalar sırasında bu varyasyonlar akılda tutulmalıdır.

**Anahtar sözcükler:** Epididim pozisyonu; infertilite; varyasyon.

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#### Submitted:

27.06.2017

#### Accepted:

23.10.2017

#### Available Online Date:

05.01.2018

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Available online at  
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### Introduction

Epididymis, vas deferens, seminal vesicle, and ejaculatory duct collectively play an important role in male fertility. Newly formed sperms

mature and gain motility during their passage through epididymis. Epididymis is anatomically composed of head, body, and tail portions and located at the posterolateral aspect of testis.<sup>[1]</sup>

Healthy men may show variations in terms of the position of epididymis, which can be detected with the help of physical examination. Pathologies involving various parts of epididymis or the absence of vas deferens may go unnoticed by urologists. This is due in part to omitting genital examination during medical education as well as neglecting it at a busy working environment. As a tertiary andrology center, our institution has urged resident doctors to determine the position of epididymis and the presence of vas deferens. Examinations by resident doctors were then confirmed by consulting physician (O.E.)

The aim of this study was to determine the frequency of positional variations of epididymis and whether this had any effect on some seminal parameters of subfertile males.

## Material and methods

Ethics committee approval was received for this study from the ethics committee of Erciyes University. Scrotal examination results and epididymal positions were retrospectively assessed in the charts of subjects presenting to our clinic for infertility, varicocele, and sexual developmental delay between May 2008 and May 2016 by E.C.A, N.B. and A.D. These subjects were examined both at supine and erect positions. Scrotal examination consisted of epididymal position, testicular volumes, and vas deferens and varicocele presence. The testicular site/s that had previously undergone scrotal and inguinal operations including herniorrhaphy, orchiopey, hydrocelectomy, orchiectomy or with vasal agenesis were excluded from the analysis.

At the second phase, the subjects with two testicles who had not undergone any scrotal surgery, who had not been affected by conditions (e.g. varicocele) that could impair fertility, who had not undergone any infertility treatment within the previous six months, and had sperms detected in semen analysis were included in the study. These subjects were examined to evaluate if epididymal position affected some semen parameters. It was also investigated whether there was any difference between the subjects with one or both epididymides at an anterior position and those with both epididymides at a posterolateral position. The subjects were categorized according to sperm counts per mL. Males with sperm counts less than 5 millions/mL, 5 to less than 15 millions/mL and 15 and more millions/mL were evaluated if the position of epididymis were different among the groups. Also, age, weight, height, body mass index were compared among the groups. If there were differences among total sperm counts, total testicular volumes (right plus left testicle), motile sperm counts and ratios were evaluated inside the groups with different epididymal positions.

A control group was created from the young males who had fathered at least one child. They had two testicles without prior surgical intervention for inguinal or testicular region. They were the males who had attended in urology clinic with the

complaints other than infertility. For statistical evaluations  $\chi^2$  and Student's t tests were used. Probability of less than 5% was considered as significant.

## Results

Scrotal examination was fully recorded in 3162 cases. We excluded one subject with bilateral anorchism, 142 subjects with varicocele and four subjects with vasal agenesis. Furthermore, the subjects who had previous surgery such as herniorrafia (n=9), orchiopey (n=8), hydrocelectomy (n=3) and orchiectomy (n=2) were also excluded. A total of 2993 subjects were included in the final analysis. A total of 5812 epididymides were examined. Table 1 shows the side, position of the examined epididymis.

Among 2908 epididymides examined at the right side, 177 (6.1%) were in an anterior position while among 2904 epididymides examined at the left side, 162 (5.6%) were in an anterior position. Of 2993 subjects whose one or both epididymides could be examined, 316 (10.6%) had one or both epididymides in an anterior position. Among 2819 subjects with two evaluable epididymides, 293 (10.4%) had one or both epididymides in an anterior position.

In the control group there were 285 males with the similar age and with both testicles. Among them there were 35 males

**Table 1. Location of epididymis**

Location of epididymis	Case (n)	Epididymis (n)
Anorchidism	1	0
Right absent, left posterolateral	19	19
Right absent, left anterior	3	3
Right absent, left unevaluable	10	0
Right posterolateral, left absent	19	19
Both posterolateral	2526	5052
Right posterolateral, left anterior	128	256
Right posterolateral, left unevaluable	58	58
Right anterior, left absent	1	1
Right anterior, left posterolateral	142	284
Both anterior	23	46
Right anterior, left unevaluable	11	11
Right unevaluable, left absent	13	0
Right unevaluable, left posterolateral	55	55
Right unevaluable, left anterior	8	8
Bilateral unevaluable	145	0
Total	3162	5812

(12.3%) with at least one epididymis in a different position. This did not result in a statistical significance when compared with the males in infertile population ( $p=0.323$ , Table 2).

Nine hundred and twenty-two subjects who did not have any syndrome, azoospermia, who had both testicles in place, and who had not undergone any scrotal or inguinal surgery or varicocele were separately evaluated. In these subjects the parameters such as age, weight, height, body mass index, sperm count, testis volumes, and sperm motility (% and count) were compared with regard to epididymal position and no significant differences could be found in any parameter ( $p>0.05$  for each).

In 57 (6.2%) of the subjects the right epididymis was located in an anterior position, the left epididymis was located anteriorly in 49 (5.3%) subjects, and both epididymis had an anterior localization in 9 (approximately 1%). Ninety-seven (10.5%) subjects had one or two epididymis in an anterior position. There was no significant difference with respect to one or two epididymides being in an anterior position between the groups allocated with respect to a sperm count above 15 million, between 5 and 15 million, and below 5 million ( $p=0.542$ ) (Table 3). Sperm counts and motility did not differ according to the position of the epididymis in analyzes performed separately within each group.

## Discussion

Male external genital organs inside scrotum consist of testis and epididymis coursing along the posterior border of the testes. Vas deferens, the excretory canal of testis, starts from the lower end of epididymis and ascends along the posterior border of testis and medial part of epididymis to join spermatic cord. Literature data suggest that there are many anatomical variations in terms of epididymal position.<sup>[2-4]</sup>

In the present study we detected that 10.6% of the subjects had at least one differently localized epididymis. Previous studies have reported that 7% of males had anteversion of epididymis.<sup>[5]</sup> In based on the results our study in 5812 patients, we suggest that this figure may go even higher.

There are also different anatomic variations than the anterior epididymal position. For instance, the head portion of epididymis may be located below and vas deferens may be anterior to spermatic cord. Sometimes testis may have a horizontal position and vas deferens may lie in an anterior position to spermatic cord. Some ultrasonography studies have also detected some previously unpublished variations, suggesting that these variations could be associated with lower sperm quality.<sup>[6]</sup> Since epididymal positions were determined via physical examination

**Table 2. Control cases and infertile males according to the position of epididymides**

Location of epididymis	Infertile case n, (%)	Control case n, (%)	p
Both posterolateral	2526 (89.6)	250 (87.7)	0.323
Least one epididymis indifferent position	293 (10.3)	35 (12.2)	
a. Right posterolateral, left anterior	128 (4.5)	14 (4.9)	
b. Right anterior, left posterolateral	142 (5)	15 (5.6)	
c. Both anterior	23 (0.8)	5 (1.8)	
Total	2819	285	

P value between the males with both posterolateral epididymides and the males with at least one epididymis indifferent position

**Table 3. The position of epididymides according to sperm count subgroups**

Sperm count (million / mL)	Location of epididymis n, (%)		p
	Bilateral epididymides with posterolateral location	One or two epididymides with anterior location	
≥15	198 (87.6)	25 (12.4)	0.542
5-<15	134 (89.3)	16 (10.7)	
<5	493 (90.3)	53 (9.7)	
Total	825 (89.5)	97 (10.5)	

in our study, possible different variations may be missed. In addition, we did not detect any clear association between epididymal position and sperm parameters and thus we could not mention such a possible association for at least the condition of anteriorly located epididymis position.

Determination of the anatomic relation with testis and epididymis via physical examination and noting possible anatomical variations is of vital importance for both diagnosis and treatment of epididymal pathologies. In an anteriorly positioned epididymis vas deferens is also in an anterior position. This may cause an incorrect diagnosis of vas deferens agenesis by an inexperienced physician who tries to palpate vas deferens behind the spermatic cord. Furthermore, failure to diagnose the same condition may also increase the possibility of injury to vas deferens located anterior to spermatic cord during inguinal surgical procedures like varicocele. Our another observation is that if the epididymal position is not determined correctly and if the epididymis is not brought and fixed posteriorly during testicular biopsy or testicular sperm extraction procedures, one might harm the epididymis.

Unfortunately, medical education has some flaws concerning the acquisition of genital examination skills. Students frequently fail to acquire such skills owing to lack of resources or fear of harming the patients or they may not attend urology classes at all.<sup>[7-9]</sup> Therefore, easier and novel approaches to epididymis examination have been introduced, albeit still insufficient. This is because these approaches are not fully applied in anterior epididymis positions and examinations are carried out when the patients are supine.<sup>[10]</sup> Hence, epididymal and testicular examinations should be performed with the patients in erect position, because supine position may not always allow clear determination of the positions of epididymis and vas deferens.

According to our personal observations, urging urology residents to note epididymal position yields better results for education. By this way they gain more skills in detecting vasal agenesis or other scrotal pathologies.

Although this research was carefully prepared with these large patient group, we still aware of its limitations and shortcomings. First of all, the study was retrospective and control group was not age matched. Second, the physical examinations of groups were examined by resident doctors and confirmed only one experienced consultant doctor whose name was O.E. Maybe the physical examinations could have been more appropriate if confirmed by another consultant in the same phenomenon (interobserver). Another limitation of study is inability to verify physical examinations by radiological such as ultrasonography.

Positional variations of epididymis can be seen at a considerable rate. Nevertheless, there was no clear relationship between these variations and infertility. In terms of avoiding possible misdiagnoses and treatment complications possible epididymal position variations should be kept in mind during clinical practice.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Erciyes University School of Medicine (Date:15.09.2017. Number: 2017/423).

**Informed Consent:** Written informed consent was not obtained from patients who participated in this study. The study was designed retrospectively and data were collected from the charts of the patients.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – O.E.; Design – O.E., E.C.A.; Supervision – O.E., A.D.; Resources – E.C.A., N.B.; Materials – O.E.; Data Collection and/or Processing – O.E.; Analysis and/or Interpretation – N.B., O.E., A.D.; Literature Search – E.C.A., N.B.; Writing Manuscript – E.C.A., N.B.; Critical Review – O.E., A.D.

**Conflict of Interest:** No conflict of interest was declared by the authors.

**Financial Disclosure:** The authors declared that this study has received no financial support.

**Etik Komite Onayı:** Bu çalışma için etik komite onayı Erciyes Üniversitesi Tıp Fakültesi'nden (Tarih: 15.09.2017 Sayı: 2017/423) alınmıştır.

**Hasta Onamı:** Yazılı hasta onamı bu çalışmaya katılan hastalardan alınmamıştır. Çalışma retrospektif olarak yapılmış ve veriler hasta kayıtlarından alınmıştır.

**Hakem Değerlendirmesi:** Dış bağımsız.

**Yazar Katkıları:** Fikir – O.E.; Tasarım – O.E., E.C.A.; Denetleme – O.E., A.D.; Kaynaklar – E.C.A., N.B.; Malzemeler – O.E.; Veri Toplanması ve/veya İşlemesi – O.E.; Analiz ve/veya Yorum – N.B., O.E., A.D.; Literatür Taraması – E.C.A., N.B.; Yazıyı Yazan – E.C.A., N.B.; Eleştirel İnceleme – O.E., A.D.

**Çıkar Çatışması:** Yazarlar çıkar çatışması bildirmemişlerdir.

**Finansal Destek:** Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

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