THE EFFECT OF TESTICULAR TORSION ON SPERMATOZOA IN CONTRALATERAL EPIDIDYMIS

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ABSTRACT

Objective: *To determine the abnormality of spermatozoa in the contralateral epididymis after unilateral testicular torsion.* ***Material & method:*** *Twenty wistar rats were divided into two groups i.e. Group B (sham procedure) Group A (torsio and orchiectomy 24 hours later), and contralateral epididymectomy was performed a month later. Spermatozoa in the contralateral epididymis are extracted and analyzed by an experienced biologist. Data were analyzed using Chi-square or Fischer exact test.* ***Results:*** *Sperm morphology changes in group B is higher than Group A (6,6% vs 0,5%, p = 0,009).* ***Conclusion:*** *Unilateral testicular torsion causes sperm abnormal morphology in the contralateral epididymis.*

Keywords: *Unilateral testicular torsion, contralateral epididimal spermatozoa.*

ABSTRAK

Tujuan Penelitian: *Untuk mengetahui kelainan morfologi spermatozoa di epididymis kontralateral pada torsio testis unilateral.* ***Bahan & Cara:*** *Peneliti mengumpulkan 20 ekor tikus Wistar berusia 60 hari ke atas, yang kemudian dibagi menjadi dua kelompok A dan B (masing-masing 10 ekor). Kelompok A adalah kelompok kontrol (tanpa perlakuan). Kelompok B mendapat perlakuan torsio testis kiri dan dilanjutkan orkiektomi setelah 24 jam. Setelah perlakuan tikus Wistar dipelihara dengan diet dan cairan yang sama selama 30 hari. Setelah 30 hari, epididymis kontralateral diambil untuk diperiksa oleh satu orang analis, untuk menilai ada tidaknya kelainan morfologi spermatozoa. Perhitungan statistik dilakukan dengan Kruskal–Wallis.* ***Hasil Penelitian:*** *Ditemukan kelainan morfologi spermatozoa lebih tinggi pada kelompok B dibandingkan kelompok A (6,6% vs 0,5%; p = 0,009).* ***Simpulan:*** *Torsio testis unilateral menyebabkan abnormalitas dari morfologi spermatozoa epididymis kontralateral.*

Kata Kunci: *Torsio testis unilateral, spermatozoa epididymis kontralateral.*

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INTRODUCTION

Effect of unilateral testicular torsion on the structure and function of contralateral epididymis is not certainly known. Existing studies still indicate controversy. However, most experts agree that testicular torsion is a risk factor for infertility, but the underlying mechanisms are also unclear. Duration of ischemia, provided therapy, and the number of torsions are suspected to affect the onset of infertility.[1] Janetschek et al. and Goldwasser et al. found no association between unilateral testicular torsion with changes in the structure of the contralateral testis and epididymis, sperm analysis, and the emergence of antisperm antibody.[2,3] Vigueras et al. found that the actions taken to unilateral testicular torsion influence the process of on contralateral testis spermatogenesis.[4] Sun et al. found that there was a decrease in spermatogenesis in both testes.[5] Goto found that there is a relationship

between unilateral torsion with damage to the seminiferous tubules and Sertoli cells of contralateral testis. He also found that the autoimmune process, with the emergence of antisperm antibodies (AsAb) can cause infertility after unilateral testicular torsion.[6]

Intravaginal testicular torsion can occur due to the lack of fixation of the testis and epididymis to the fascia and muscles located in the scrotum. Consequently, there is a mobile abnormal testis within the space of tunica vaginalis (bell clapper deformity). Although torsion can occur pre-puberty, an estimated increase in testis weight at puberty influences the incidence of testicular torsion. Testicular torsion can occur after trauma or activity. However, it can also occur spontaneously.[1]

Irreversible ischemic injury begins to occur 4 hours after torsion. Bartsch et al. found that although detorsion is done less than 8 hours and the morphology of the testes returned to normal, only 50% of observed males had normal semen analysis. Several studies have found that unilateral testicular torsion affects fertility. Marco et al. found that there was no significant relationship between unilateral testicular torsion and the occurrence of abnormalities in semen analysis, the level of Folicle Stimulating Hormone (FSH) serum, and levels of antisperm antibodies (Abas). Vigueras et al. found that the actions taken to unilateral testicular torsion influences spermatogenetic process in contralateral testis, especially in VI-XI spermatogenetic process. Anderson et al. found that no changes in sperm quality after detorsion in testicular torsion. However, levels of FSH level was abnormal (p = 0,25). In orchyectomy group (69 hours post-torsion), there was decline in sperm quality (p = 0,001) and FSH levels, with average sperm density of 29 million/ml. They concluded that there were structural and functional changes in ipsilateral and contralateral testes after torsion, regardless of the procedure. Sun et al. found that there was a decrease in spermatogenesis in both testes. Goto found relationship between unilateral torsion with contralateral testicular seminiferous tubular damage. The changes occurred after 3-5 weeks, which included decreased spermatocytes, loss of spermatids and spermatozoa, and abundant Sertoli cells (Sertoli cells only tubule). He also found that the autoimmune process causes damage to the testes after unilateral testicular torsion. Merimsky et al., Riebkiewyck et al., Fu et al., and Kosar et al. found that testicular torsion induces the onset of antisperm antibody.[1-13]

However, testis has blood-testis barrier that acts to prevent contact between the antibody with the surface of spermatozoa. According to Howards et al,[7] in the epididymis there is blood-epididymis barrier, which is semi-permeable, so that antibodies are allegedly released through the epididymis. However, this has not been not known for certain.

OBJECTIVE

To evaluate the morphology of spermatozoa in unilateral testicular torsion of contralateral epididymis.

MATERIAL & METHOD

This study was an experimental study. The study was conducted between July 2009 and August 2009 at Hasan Sadikin Hospital (RSHS) Bandung, West Java.

Target population of this study were mice with unilateral testicular torsion. Accessible populations studied were wistar rats aged 60 days and more. Research subjects included 20 Wistar rats aged 60 days and more.

Criteria for inclusion in the study were wistar rats aged over 60 days, while the dropout criteria were mice that died during the study period.

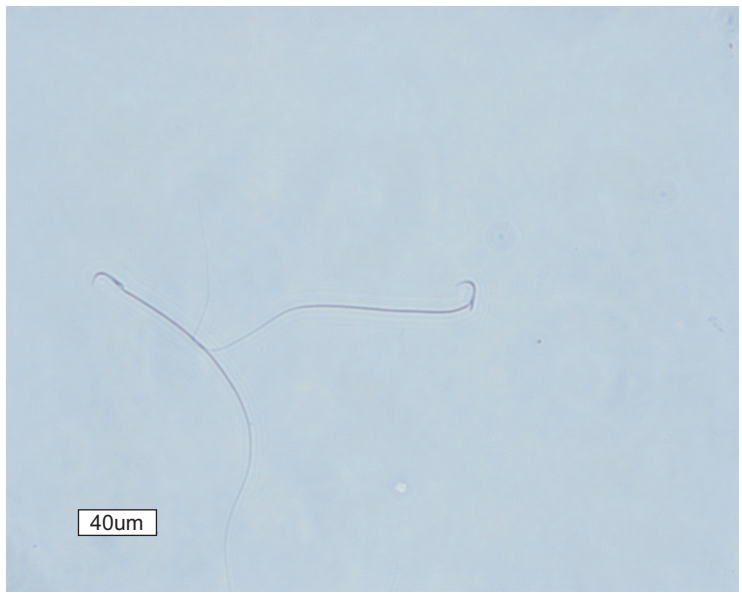
In this study the sample size was 20 rats. The number 20 was determined considering the minimum number that allows to obtain a statistically normal distribution. The number was considered sufficiently representative, given the measured effect was a surrogate marker.

The authors collected 20 wistar rats aged 60 days and more, which were then divided into two groups labeled A and B (each of 10 rats). Group A was control group (without treatment). Group B received treatment and left testicular torsion and followed with orchiectomy after 24 hours.

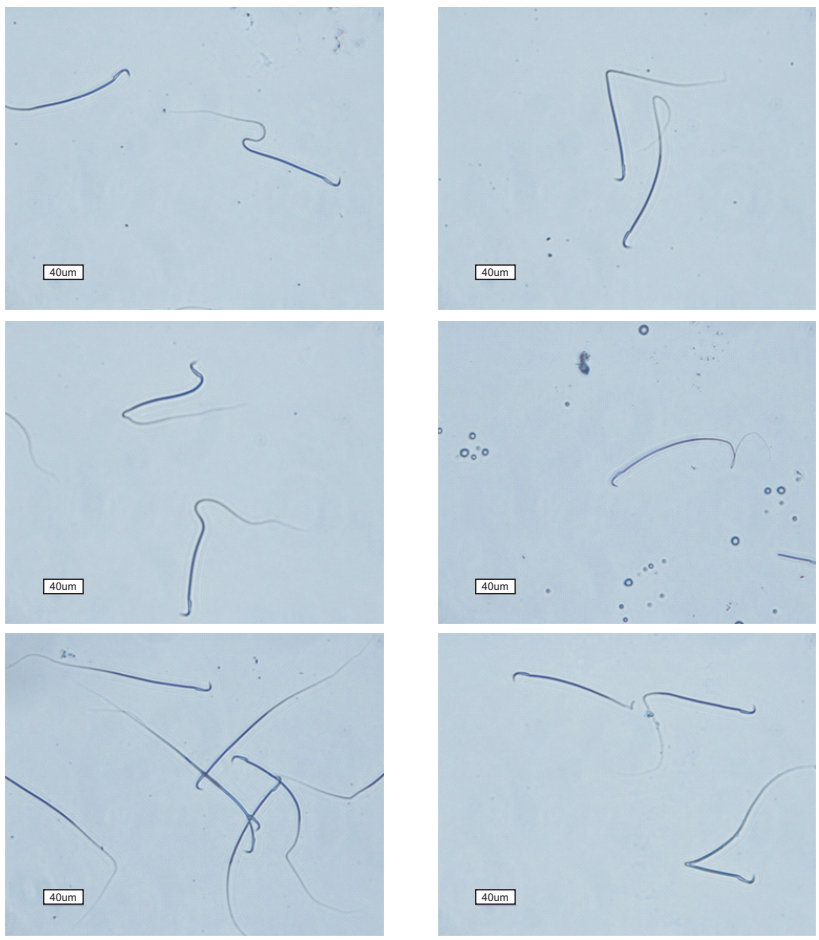
Surgical procedures were performed in general anesthesia, with ketamine (100 mg/kg). After treatment, the wistar rats were maintained with the same liquid diet for 30 days. After 30 days, contralateral epididymis was taken to be examined by one analyst to assess the morphology of spermatozoa.

Statistical calculations were performed with Kruskal-Wallis test according to the scale of the variables compared. This research used SPSS 16 computer programs to aid the calculation, with $p < 0,05$ declared as significant.

RESULTS



Gambar 1. Spermatozoa epididymis normal



Gambar 2. Spermatozoa epididymis abnormal

Table 1. Result distribution.

Group	Mean	n	SD
Group A	0,5 %	10	0,2
Group B	6,6 %	10	1,4
Total	7,5 %	20	1,6

Abnormal spermatozoa morphology in group B was higher than that in group A (0,5% vs 6,6%, with p = 0,009).

DISCUSSION

Unilateral testicular torsion was found not to affect contralateral testis spermatogenesis both in quantity and quality. This is consistent with the results of Marco et al. However, several studies found the opposite results. Literatures mentioned that the turnover rate in seminiferous tubules was ranging in 72 days. This study only observed changes in spermatogenesis for 30 days. It was very likely the change of spermatogenesis had not been seen in that period.[1,3-7,11,12]

From the results of the study, group A (without treatment) showed abnormal spermatozoa morphology in contralateral epididymis by 0,5%, while that in group B (the left testicular torsion) was higher (6,6%). Looking at these results, it was suggested that antisperm antibody enters into the reproductive system through the epididymis and thus affected spermatozoa morphology, given that previous studies showed that unilateral testicular torsion does not affect the contralateral testis spermatogenesis.

This supports the hypothesis that unilateral testicular torsion causes abnormalities of the contralateral epididymis spermatozoa morphology. Further research is needed by including large samples and other parameters, such as sperm motility.

CONCLUSION

Unilateral testicular torsion causes morphological abnormalities of the contralateral epididymis spermatozoa.

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