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Effect of Closing Processus Vaginalis in Orchidopexy to Recurrence and Testicular Atrophy – 15 Years Experience

Orşidopekside Patent Processus Vajinalis Kapatılmasının Nüks ve Atrofi üzerine Etkisi-15 Yıllık Deneyim

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Abstract: Undescended testis is one of the most common pathologies encountered by pediatric surgeons. In traditional orchidopexy operation, patent processus vaginalis (PPV) is dissected from testicular vessels and spermatic cord. In this study, it was aimed to compare the results of undescended testis patients with and without PPV closure in terms of recurrence and atrophy. After the approval of the local ethics committee, patients who were operated for undescended testis between January 2007 and December 2022 were evaluated. Patients were determined in two groups. first group was with PPV ligation (n=171), second group was without PPV ligation (n=1637). Inguinal hernia was not observed after any operation. There were 23 recurrences (%13,4) in group 1 and 48 recurrences (%2,9) in group 2. According to the preoperative evaluation; A decrease in testicular size was detected in 5 patients (2.9%) in Group 1 and 8 patients (0.4%) in Group 2 in the postoperative follow-up. There is no need to ligate the PPV with additional dissection and open the external oblique fascia if it is predicted that the spermatic cord and testicular vessels may come to scrotum without tension in patients who underwent orchiopexy surgery.
Keywords: Undescended Testis, Orchidopexy, Processus Vajinalis

Özet: İnmemiş testis, çocuk cerrahlarının en sık karşılaştığı patolojilerden biridir. Geleneksel orşiyopeksi operasyonunda, açık prosessus vajinalis (PPV), testis damarları ve spermatik korddan diseke edilir. Bu çalışmada, PPV kapatılması olan ve olmayan inmemiş testis hastalarının sonuçlarının nüks ve atrofi açısından karşılaştırılması amaçlandı. Yerel etik kurul onayı alındıktan sonra Ocak 2007 - Aralık 2022 tarihleri arasında inmemiş testis nedeniyle opere edilen hastalar değerlendirildi. Hastalar iki gruba ayrıldı. Birinci grupta PPV ligasyonu olan (n=171), ikinci grupta PPV ligasyonu olmayan (n=1637) hastalar olmak üzere toplam 2 grup oluşturuldu. Operasyonlardan sonra takipte inguinal herni izlenmedi. Grup 1'de 23 nüks (%13,4), grup 2'de ise 48 nüks (%2,9) görüldü. Ameliyat öncesi değerlendirme ile karşılaştırıldığında; ameliyat sonrası takipte Grup 1'de 5 hastada (%2,9) ve Grup 2'de 8 hastada (%0,4) testis boyutunda azalma tespit edildi. Orşiopeksi ameliyatı geçiren hastalarda spermatik kord ve testis damarlarının gerginlik olmadan skrotuma gelebileceği öngörülüyorsa PPV' yi ek disseksiyonla bağlamaya ve eksternal oblik fasyayı açmaya gerek yoktur.
Anahtar Kelimeler: İnmemiş Testis, Orşiopeksi, Processus Vajinalis

Ethics Committee Approval: This study was designed and conducted in accordance with the ethical guidelines set forth in the Declaration of Helsinki, and the study protocol was approved by the Ankara University Clinical Research Ethical Committee (Decision no: İ11-693-22 Date: 10.01.2023)

Informed Consent: The authors declared that it was not considered necessary to get consent from the patients because the study was a retrospective data analysis

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1. Introduction

Undescended testis is one of the most common pathologies encountered by pediatric surgeons, with a rate of 9% in term births and 30% in preterm births. [1]. The incidence of the condition at 1 year of age is 0.8% [2]. More than 90% of patients are thought to have patent processus vaginalis (PPV). [1]. It is recommended that uncircumcised testes be operated on between 6 months and 1 year to prevent malignancy and infertility [1].

The PPV has been found to be open in 80-94% of neonates and 20% of adults, and the timing of PPV closure is still unknown [3]. In traditional orchidopexy surgery, the PPV is dissected from the testicular vessels and spermatic cord, and after dissection PPV is closed with a stitch. [4, 5]. However, this procedure may cause damage to the vessels and atrophy due to the damaged vessels [6, 7].

The aim of this study was to compare the outcomes of patients with undescended testis with and without PPV closure in terms of recurrence and atrophy.

2. Materials and Methods

After approval by the local ethics committee, patients who had undergone surgery for undescended testis between January 2007 and December 2022 were evaluated. Patient demographic and clinical findings were obtained from the hospital record system. Patients who underwent laparoscopic orchidopexy, had sex differentiation disorder, and were found to have an inguinal hernia on preoperative examination were excluded from the study. All patients underwent surgery via a traditional inguinal approach. Postoperative follow-up of the testis, which was smaller before surgery due to age and/or compared with the contralateral testis, followed by comparison with preoperative assessment and comparison with the contralateral testis. Patients were divided into two groups. The first group was with PPV ligation, and the second group was without PPV ligation.

Table 1. Inguinal canal opening and PPV closure rates

	Need to open inguinal canal(External oblique's fascia)	No need to open inguinal canal (External oblique's fascia)	Total
Group 1 (With PPV Closure)	n=68	n=103	n=171
Group 2 (Without PPV Closure)	n=27	n=1610	n=1637

Surgical technique: after the fibrotic adhesions were released, it was checked at each stage whether the testicles descended into the scrotum. If sufficient length was achieved, a Dartos pouch was created and the testis was placed in the scrotum. If sufficient length was not obtained and the PVV structure was detected, it was dissected and ligated. If sufficient length was again not obtained, the inguinal canal was opened and dissection continued. If sufficient length was not obtained after opening the inguinal canal, the PPV structure was dissected and ligated.

Statistical Package for Social Sciences (SPSS, version 15.0, Chicago, IL.) was used to perform the analyses. In descriptive statistics, quantitative variables were expressed as mean ± standard deviation or median (minimum-maximum) according to normal distribution, and qualitative variables were expressed as frequency (percent). The demographic and clinical data of the subjects included in the study were analysed with Pearson chi-square or Fisher's exact test for qualitative variables. The accepted statistical significance level was $p < 0.05$.

3. Results

The mean age at surgery was 37 months (minimum 6-maximum 119). A total of 1808 testicles underwent orchidopexy. Of these, 171 testes were in group 1 and 1637 testes were in group 2. The details of the surgery are shown in Table 1. At preoperative examination, 1775 testes were found in the inguinal canal and 33 testes were brought to the inguinal canal. It was observed that the undescended testes ligated with PPV were higher and more tense during surgery, so the PPV was ligated to reduce the tension and allow stretching of the testis.

No inguinal hernia was observed after surgery during the follow-up period. There were 23 recurrences (13.4%) in group 1 and 48 recurrences (2.9%) in group 2. The recurrence rate in group 1 was statistically higher ($p < 0.001$).

In group 1, 56 patients (32.7%) had testicles that were too small before surgery. At postoperative follow-up, the finding was found to persist in 6 patients (3.5%). A reduction in testicular size was noted in 5 patients (2.9%) compared to the preoperative assessment. In group 2, 215 patients (13.1%) had testes that were too small before surgery. At postoperative follow-up, the finding was found to persist in 76 patients (4.6%). A reduction in testicular size was noted in 8 patients (0.4%) compared to the preoperative assessment.

The testicular dimensions were determined by physical examination. The expected size according to age and contralateral testes, the patient's previous and subsequent examination findings were compared.

Infection of the surgical site was noted in 3 patients and hematoma in 1 patient. No further complications occurred after surgery.

4. Discussion and Conclusion

The incidence of undescended testis at about 1 year of age is 0.8% [2]. The testis is palpable in 80% of patients and 90% of palpable testes are located in the inguinal canal [1]. Patients with undescended testis have a higher risk of infertility, malignancy, and testicular torsion compared with the general population; therefore, it is recommended that these patients undergo surgery before 18 months of age [1, 3].

PPV is a peritoneal appendage associated with testicular descent [8]. Non-obliterated PPV is related to undescended testis, hydrocele and inguinal hernia [9]. It is believed that 90% of patients with undescended testis have concomitant PPV [1].

It is recommended to ligate the PPV after dissection of spermatic cord and vessels in traditional orchidopexy [3]. Davey et al. have shown that dissection of the PPV results in 60% greater expansion of the spermatic cord and vessels [10]. It is believed that the main causes of failed orchidopexy are inadequate expansion of the spermatic cord, open PPV, and inadequate fixation of the scrotum [11]. However, in this study, recurrence rates were found to be statistically higher in the closed PPV group.

The patency rate of the processus during orchiopexy was 36.1% as reported by Dayanc et al [12]. More importantly, they were able to successfully perform orchiopexy in 94.4% of cases and found no hernia or hydrocele formation at follow-up [13]. Iyer et al. reported a success rate of 96.2% in 367 orchiopexies performed with the high scrotal approach [14]. This study found that the recurrence rate was lower in patients whose PPV was not closed.

Some studies recommend not closing the PPV after dissection, but other studies recommend closing the PPV because it may lead to inguinal hernia [15]. In this study, inguinal hernia was not observed in any of the patients. Ceccanti et al. and Jain et al. showed similar results to our study [4, 6], in which no inguinal hernia occurred after orchidopexy.

Schier et al. stated that in laparoscopic hernia repair there is no difference between cutting the hernia sac and ligating it, explaining that the open inner ring of the inguinal canal does not clinically cause hernia [16]. Handa et al, on the other hand, argued that closure of the inner ring of the inguinal canal is unnecessary in laparoscopic orchipexia and does not clinically cause inguinal hernia [17].

Since the PPV is adjacent, care must be taken not to injure the vas deferens and vessels during dissection [18]. Testicular atrophy, which may occur after orchiopexy, may lead to serious loss of testicular function in the future. The incidence of testicular atrophy associated with orchiopexy ranges from 8-32% [19]. Dissection of the PPV can lead to damage of the spermatic cord and testicular vessels [15]. It is more risky at young age [6, 7]. In this study, the testes were better after surgery in both groups. Shirazi et al. compared two groups of undescended testes [15]. In the first group, the PPV was closed, and in the second group, the PPV was stretched. The atrophy rate was statistically lower in the second group. Damage to the vessels during dissection or suturing of the PPV may lead to atrophy.

The exact closure time of the PPV is unknown. It has been found to be open in 80-94% of neonates, while it is open in 20% of adults [3]. In previous studies, the detection rate of PPV was determined to be 20-59% in scrotal orchiopexies and 90% in laparoscopic orchiopexies, and it reaches up to 100% in laparoscopy-assisted transscrotal orchiopexies [8]. The inconsistencies in the

detection of PPV can be explained not only by the differences between incisions and approaches, but also by the incomplete understanding of its etiology and closing process. We believe that PPV dissection is unnecessary for testes that can be easily lowered into the scrotum.

In this study, no increase in complications related to recurrence and herniation was observed when the PPV was not fixed in the testis but an extension of the cord was achieved by dissection, which would easily reach the scrotum. Because PPV dissection and ligation procedures may cause damage to the spermatic cord and vascular structures in the testis in patients and may cause infertility and testicular atrophy in the future, we believe that dissection should be avoided.

The study has limitations. One of the limitations is that the study presented was a retrospective evaluation, so the groups were not randomly divided and the number of patients in the groups was unevenly distributed. Another limitation is that the decision to perform PPV ligation was based on the tension of the testicular structures during surgery. To obtain more accurate and reliable results, it is necessary to perform a randomized, controlled, and prospective study.

There is no need to ligate the PPV with additional dissection and to open the fascia obliqua externa if it can be assumed that the spermatic cord and testicular vessels can reach the scrotum without tension in patients who have undergone orchiopexy for undescended testis. There is no difference in recurrence and iatrogenic inguinal hernias in operations performed without dissection and ligation. Additional dissections lead to a higher risk of infertility and testicular atrophy in the future.

REFERENCES

1. Elseth A, Hatley RM. Orchiopexy. [Updated 2022 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK560904/
2. Alchoikani N, Ashour K. Ascending testis: A congenital predetermined condition. J Pediatr Urol. 2021 Apr;17(2):192.e1-192.e3.
3. Radmayr C., Bogaert G., Burgu B., et al. Management of undescended testes. In: EAU Guidlines on Paediatric Urology. 2022. Available at: https://uroweb.org/guidelines/paediatric-urology Accessed on 15 May 2023.
4. Ceccanti S, Zani A, Mele E, Cozzi DA. Orchidopexy without ligation of the processus vaginalis is not associated with an increased risk of inguinal hernia. Hernia. 2014 Jun;18(3):339-42.
5. Thorup J, Haugen S, Kollin C, et al. Surgical treatment of undescended testes. Acta Paediatr. 2007;96(5):631-637.
6. Jain VK, Singh S, Garge S, Joshi M, Sanghvi J. Orchidopexy san ligation technique of orchidopexy. Afr J Paediatr Surg. 2011;8(1):112-114.
7. Tabrizian F, Raisolsadat SM, Houshmand B, Yaghubi MA. Assessment of the necessity of sac high ligation in inguinal hernia open surgery among children. J Pediatr Surg. 2013;48(3):547-549.
8. Zhao W, Su C, Li S, Mo Z. Comparison of the Detection and Ligation of Patent Processus Vaginalis Between Laparoscopy-Assisted Transscrotal Orchiopexy and Single Scrotal Incision Orchiopexy. Front Surg. 2022;8:819057. Published 2022 Jan 31.
9. Tanyel, F.C., Obliteration of processus vaginalis: aberrations in the regulatory mechanism result in an inguinal hernia, hydrocele or undescended testis. Turk J Pediatr, 2004. 46 Suppl: p. 18-27 PMID:15499794
10. Davey RB. Orchidopexy: the relative importance of each step of mobilisation. Pediatr Surg Int. 1997;12(2/3):163-164 PMID:9069223
11. Noseworthy J. Recurrent undescended testes. Semin Pediatr Surg. 2003;12(2):90-93.
12. Dayanç M, Kibar Y, Tahmaz L, Yildirim I, Peker AF. Scrotal incision orchiopexy for undescended testis. Urology. 2004;64(6):1216-1219.
13. Bassel YS, Scherz HC, Kirsch AJ. Scrotal incision orchiopexy for undescended testes with or without a patent processus vaginalis. J Urol. 2007;177(4):1516-1518.
14. Iyer, K.R., Kumar, V., Huddart, S.N., Bianchi A. The scrotal approach. Pediatr Surg Int 10, 58–60 (1995).
15. Shirazi M, Safavi S, Makarem A, Malekmakan L. Comparison Between Processus Vaginalis Sac Tightening Technique and the Conventional Technique in Orchiopexy Surgery Over 10 Years. Res Rep Urol. 2020;12:129-136. Published 2020 Mar 18.
16. Schier F. Laparoscopic inguinal hernia repair-a prospective personal series of 542 children. J Pediatr Surg. 2006;41(6):1081-1084.
17. Handa R, Kale R, Harjai MM. Laparoscopic orchiopexy: is closure of the internal ring necessary?. J Postgrad Med. 2005;51(4):266-268 PMID:16388167
18. Lin J, Li D, Chen J, Lin L, Xu Y. Inguinal hernia repair by Bianchi incision in boys: a retrospective study. Pediatr Surg Int. 2018;34(3):289-295.
19. Ok F, Durmus E, Ayaz M. The role of the resistive index in predicting testicular atrophy after orchiopexy in unilateral undescended testis. Pediatr Surg Int. 2022;39(1):38. Published 2022 Dec 8.