

ORIGINAL ARTICLE

Is there any advantage in the use of absorbable sutures in congenital penile curvature surgery performed in childhood?



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KEYWORDS

Penile curvature;
Penile plication;
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Abstract

Objective: To compare the long-term outcomes of corporeal plication using absorbable versus nonabsorbable sutures for the treatment of congenital penile curvature in childhood.

Materials and methods: Forty seven children who underwent congenital penile curvature repair between 11 and 140 months of age were included in the study. All children were operated on using the incisional plication technique and were divided into two groups: Absorbable-polyglactine (PLG, $n = 23$, 48.93%) and nonabsorbable-polypropilen (PP, $n = 24$, 51.06%) according to the suture material used for plication. Surgical outcomes were compared between groups.

Results: Mean follow-up period was 19.02 ± 4.66 months. There was no significant difference between the mean age of the children in two groups included in the study (PLG = 41.39 ± 34.63 months vs PP = 53.66 ± 37.42 months, $p = 0.250$). There was no significant difference in penile straightening degree between the two groups in the postoperative follow-up (PLG = 27.39 ± 6.88 vs PP = 31.08 ± 6.38 , $p = 0.06$). Similarly, there was no significant difference between two groups in terms of postoperative curvature recurrence ($p = 0.681$). However, palpable suture knots in the plication area was significantly higher in the PP group in the postoperative period (25.0% vs 4.3%, $p = 0.047$).

Conclusion: The use of absorbable sutures in congenital penile curvature surgery in childhood has similar success rates with the use of nonabsorbable sutures and provides lower complications that are secondary to nonabsorbable sutures.

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PALABRAS CLAVE

Curvatura de pene;
Plicatura de pene;
Técnicas de sutura

¿Existe alguna ventaja de utilizar suturas absorbibles en la cirugía de curvatura de pene congénita realizada en niños?**Resumen**

Objetivo: Comparar los resultados a largo plazo de la plicatura corpórea utilizando suturas absorbibles vs. no absorbibles para el tratamiento de la curvatura de pene congénita en niños.

Materiales y métodos: Se incluyó en el estudio a 47 niños sometidos a reparación de curvatura congénita del pene de entre 11 y 140 meses de edad. Todos los niños fueron operados utilizando la técnica de plicatura incisional, dividiéndose en dos grupos: poliglactina absorbible (PLG, n = 23, 48,93%) y polipropileno no absorbible (PP, n = 24, 51,06%), en virtud del material de sutura utilizado para la plicatura. Se compararon los resultados quirúrgicos entre los grupos.

Resultados: El periodo de seguimiento medio fue de $19,02 \pm 4,66$ meses. No se produjo diferencia significativa en cuanto a la edad media de los niños de los dos grupos incluidos en el estudio (PLG = $41,39 \pm 34,63$ meses vs. PP = $53,66 \pm 37,42$ meses, $p = 0,250$). No se produjo diferencia significativa en cuanto a enderezamiento del pene entre los dos grupos durante el seguimiento posoperatorio (PLG = $27,39 \pm 6,88$ vs. PP = $31,08 \pm 6,38$, $p = 0,06$). De igual modo, no existió diferencia significativa entre los dos grupos en términos de recidiva posoperatoria de la curvatura ($p = 0,681$). Sin embargo, los nudos palpables de sutura en la zona de plicatura fueron significativamente mayores en el grupo PP en el periodo posoperatorio (25 vs. 4,3%, $p = 0,047$).

Conclusión: El uso de suturas absorbibles en la cirugía de curvatura congénita de pene en niños tuvo tasas de éxito similares con el uso de suturas no absorbibles, aportando menores complicaciones que las secundarias a las suturas no absorbibles.

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Introduction

Congenital penile curvature (CPC) in childhood is defined as the penis is not straight during the erection in the absence of additional pathologies such as hypospadias or epispadias.¹ The prevalence of CPC in general population is reported at rates ranging from 0.04% to 0.06%.² Curvature is often ventral and more rarely seen in dorsal, right lateral, left lateral or mixed forms.³ Unbalanced skin tension, abnormal Buck's or Dartos fascia, corporeal developmental disorders or rarely seen short urethra are among the etiological factors.⁴

European Association of Urology (EAU) pediatric urology guideline recommends surgical correction of penile curvatures of 30° and above, without specifying any age range.⁵ Although developing techniques in penile curvature surgeries have reduced complications, nonabsorbable sutures used for plication can cause pain, granuloma, disturbing palpable knots in the postoperative period, thereby reducing the satisfaction rate of the operation.⁶ For these reasons, studies suggesting the use of absorbable sutures in adult plication surgeries have been published recently to reduce suture-related complications.⁷ However, there is insufficient data in the literature regarding the results of absorbable sutures used in childhood CPC surgeries.

In this study, we hypothesized that CPC surgery using absorbable sutures can be performed with a high level of success and acceptable complication rates.

Material and methods

We retrospectively analyzed the data of 47 pediatric patients between 11 and 140 months range of age that we performed penile plication surgery due to CPC between 2012 and 2018. In our study, both the patient files, the electronic data records as well as the data we obtained by examining the children were used. Children with minimum 30° of preoperative curvature and no additional penile pathology (hypospadias, epispadias, urethral anomalies, etc.) were included in the study. While 14 (29.78%) of the children were noticed by their families that the penis was curved during erection, for the other 33 (70.21%) children it was determined by creating an artificial erection with saline injection under general anesthesia upon suspicion during physical examination in patients who applied for circumcision.

The incisional plication technique described by Yachia was used in all children.⁸ After preparing the operation area, a urethral catheter was placed into the bladder. Following a complete penile degloving until Buck's fascia, an artificial erection was achieved using a saline injection. The degree of curvature was measured after providing adequate erection. The outer surface of the tunica albuginea where the curvature was maximal was marked with a marker pen. After opening the Buck's fascia we incised the tunica albuginea on the line of the marked area longitudinally, then a 3.0/4.0 absorbable polyglactin or nonabsorbable polypropylene suture in accordance with primary surgeon's discretion was placed

Table 1 Comparison and preoperative demographic characteristics of both groups.

	PLG(<i>n</i> = 23, 48.93%)	PP(<i>n</i> = 24, 51.06%)	<i>P</i> value
Age, months (Mean ± SD)	41.39 (±34.63)	53.66 (±37.42)	0.250
Curvature degree (Mean ± SD)	34.34 (±7.43)	38.95 (±7.65)	0.042
Curvature type (<i>n</i> , %)			
Ventral	10 (43.5%)	19 (79.2%)	
Dorsal	9 (39.1%)	2 (8.3%)	
Right lateral	1 (4.3%)	2 (8.3%)	
Left lateral	3 (13.01%)	1 (4.2%)	

PLG: polyglactine, PP: polypropilene, *n*: number, SD: standard deviation.

using by inverted stitch technique through the full-thickness of the tunica albuginea transversally on the opposite site of the curvature. Depending on the size of the penis and the degree of curvature, we made a different numbers of sutures (between 1 and 6). Afterwards, the suture line covered with a dartos fascial flap. Then we checked the penis to be sure that the curvature was straight enough. The urethral catheter was removed after the operation. When they came to the 12th month check-up, we checked the penis with a physical examination. In some of children, erection was achieved with tactile stimulation, while in others, the curvature was checked by means of photographs taken by their families at home. We noted if there were any palpable suture knots, fibrotic plaque, residual curvature or penile shortening by consulting with their parents. The palpable knots were determined by parents or surgeons in younger children and by patients themselves in older childrens.

According to the suture materials used, children were divided into two groups: Absorbable polyglactine (PLG, *n* = 23, 48.93%) and nonabsorbable polypropilene (PP, *n* = 24, 51.06%). Patients with a curvature of 20° or more during follow-up were considered as having a recurrence. The groups were compared in terms of operation time, degree of penile straightening, penile shortening, recurrence rate and presence of palpable suture knots.

Data were analyzed by using SPSS 25.0 (IBM Corp.) software. In the univariate analysis, nominal data were compared using a chi-square test. Parametric variables were compared using a *t*-test while nonparametric variables were compared using the Mann-Whitney *U* test. Mean ± standard deviation was used for parametric data while median and range was used for nonparametric data. Statistical significance was defined as *p* < 0.05.

Results

There was no significant difference between the mean age of the children in both groups (PLG = 41.39 ± 34.63 months vs PP = 53.66 ± 37.42 months, *p* = 0.250). Mean follow-up period was 19.02 ± 4.66 months (range: 12–32 months). However, the mean preoperative curvature degree of the PP group was significantly higher than the PLG group (*p* = 0.042). The preoperative curvature characteristics and demographic data of the patients are shown in Table 1.

It was observed that there was no significant difference between mean operation times of both groups (*p* = 0.552). Similarly, mean straightening degree of penile

curvature of both groups were similar (PLG = 27.39 ± 6.88° and PP = 31.08 ± 6.38°, *p* = 0.066). Additionally, there was no significant difference in the postoperative mean penile shortening and curvature recurrence rates between two groups (*p* = 0.282, *p* = 0.681, respectively). However, in the postoperative period, the presence of disturbing palpable sutures on the plication area was detected in 6 of 24 (25.0%) patients in the PP group, however it was only 1 of 23 (4.36%) children in the PLG group. This rate was significantly higher in the PP group (*p* = 0.045). Postoperative results of the patients are shown in Table 2.

Discussion

Many authors suggest that CPC surgery should be performed in the postpubertal period after completing the development of the penile corpus cavernosum and urethra.^{9,10} On the other hand, there are also studies indicating that the curvature of the penis in the prepubertal period may negatively affect the psychosocial development of children, therefore it would be more appropriate to perform surgery in prepubertal childhood.^{11,12} While there are various studies comparing the use of absorbable and nonabsorbable sutures in adult plication surgeries, there are no studies in this area relating to childhood.¹³ Therefore, in this study, we aimed to report our comparative results in patients who were operated on using absorbable or nonabsorbable suture materials due to CPC in the prepubertal period.

Despite the high reported success rates, one of the most important problems in CPC surgeries is complications secondary to nonabsorbable sutures used for plication.¹⁴ Nonabsorbable sutures may cause serious physical and psychological problems in patients in the postoperative period due to the complications such as granuloma, penile pain and palpable fibrotic plaque as a result of tissue reaction in the plication area over the long-term.¹⁵ Van der Horst C et al. reported the results of their plication surgery in 55 patients using two different nonabsorbable sutures.⁶ Accordingly, 37 (67.27%) of the patients in the postoperative period felt suture material, 13 (23.63%) patients were uncomfortable with this condition and 4 (7.27%) patients had painful erections. In another study involving 35 adult patients by period aBasiri et al. absorbable sutures were used for plication in 17 (48.57%) patients, while nonabsorbable sutures used in 18 (51.42%) patients.¹⁶ According to this study, palpable sutures were detected in 7 (38.88%) patients in the nonabsorbable group in the postoperative period, and they

Table 2 Comparison of postoperative outcomes for both groups.

	PLG (n = 23, 48.93%)	PP (n = 24, 51.06%)	P value
Operation time (minutes, mean $\pm$ SD)	42.82 ($\pm$ 6.36)	43.95 ($\pm$ 6.59)	0.552
Penile straightening degree (mean $\pm$ SD)	27.39 ($\pm$ 6.88)	31.08 ($\pm$ 6.38)	0.066
Penile shortening (mm, mean $\pm$ SD)	0.73 ($\pm$ 1.73)	1.50 ($\pm$ 2.48)	0.282
Recurrence of curvature ($>20^\circ$)	4 (17.4%)	3 (13.0%)	0.681
Palpable suture knots (n, %)	1 (4.3%)	6 (25.0%)	0.047

PLG: polyglactine, PP: polypropylene, n: number, SD: standard deviation.

were detected in only 1 (5.88%) patient in the absorbable group ($p=0.04$). Shortening of penile length was reported by 3 (16.7%) patients in nonabsorbable group and 4 (23.5%) in absorbable group ($p=0.69$). They reported no significant difference in patients' satisfaction rate between two groups (82% in absorbable group vs. 66% in nonabsorbable group, $p=0.44$). In other study, Hauck et al. reported the results of 23 adult patients underwent plication surgery using nonabsorbable soft Goretex sutures to reduce the suture related complications.¹⁷ They reported postoperative suture related complications such as pain, dysesthesia and foreign-body sensation in only 2 of 23 (8.69%) patients. In 17 (73.91%) patients penile straightening could be achieved but 6 (26.08%) developed recurrent curvature. In our study, penile straightening and recurrence rates of the curvature were similar in both groups. The palpable suture knot rate was significantly lower in PLG group compared to the PP group. This result also supports the idea that using absorbable sutures in childhood plication surgeries, similar to the results in adult patients, can reduce postoperative suture-related complications without changing the success rate.

In a study conducted by Ozkuvanci et al., it was revealed that plication surgeries performed in the prepubertal period using nonabsorbable sutures can lead to recurrence in the postpubertal period.¹⁸ In this study, in the follow-up of plication surgeries using nonabsorbable sutures in 13 children in the prepubertal period, a fairly high rate of curvature recurrence [ranging from 30 to 50° in 7 (53.84%) of the patients] was reported in the postpubertal period. Yachia noted the high curvature recurrence reported in this study, emphasizing the suture material used and the operation technique and stated that the nonabsorbable suture used for plication may cause cuts on the edge of the plication during a rigid erection in the postpubertal period and this may also play a role in the high recurrence rate.¹⁹ In our study, no significant difference was found between PLG and PP groups in terms of curvature recurrence. These findings indicate that the use of absorbable sutures in plication surgeries performed in childhood can provide similar success rates with the use of nonabsorbable sutures.

The retrospective nature of our study and short follow-up period are the main limitations of the present study. In addition, the fact that the degree of preoperative curvature was significantly higher in PP group is another limitation of our study. Finally, in the present study we evaluated the recurrence rates; however as we mentioned in the discussion part, it would be more appropriate to evaluate the recurrence in the postpubertal period. For this reason, due to the short follow-up period long-term results of this study

are needed to make a more accurate assessment of recurrence rates. Despite these limitations, we think that our study will make a significant contribution to the literature since it is the first study comparing absorbable and nonabsorbable suture materials in plication surgeries performed in childhood.

Conclusion

Similar success rates to nonabsorbable sutures can be achieved with the use of absorbable sutures in prepubertal childhood CPC surgery. In addition, the formation of disturbing palpable suture knots in the postoperative period can be significantly reduced by the use of absorbable sutures. Consequently, in our opinion, the use of absorbable sutures for plication seems better because of less palpation of knots but recurrence have not been correctly evaluated in this study.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

Conflict of interest

The authors declare no conflict of interest.

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References

1. Sokolakis I, Schonbauer P, Mykoniatis I, Kubler H, Gschwend J, Lahme S, et al. Long-term results after surgical treatment of congenital penile curvature using a modified Nesbit technique. *World J Mens Health*. 2019.
2. Yachia D, Beyar M, Aridogan IA, Dascalu S. The incidence of congenital penile curvature. *J Urol*. 1993;150 Pt 1:1478–9.
3. Kelami A. Congenital penile deviation and its treatment with the Nesbit-Kelami technique. *Br J Urol*. 1987;60:261–3.

4. Mingin G, Baskin LS. Management of chordee in children and young adults. *Urol Clin North Am*. 2002;29:277–84, v.
5. Hatzimouratidis K, Eardley I, Giuliano F, Hatzichristou D, Moncada I, Salonia A, et al. EAU guidelines on penile curvature. *Eur Urol*. 2012;62:543–52.
6. van der Horst C, Martinez Portillo FJ, Melchior D, Bross S, Alken P, Juenemann KP. Polytetrafluoroethylene versus polypropylene sutures for Essed-Schroeder tunical plication. *J Urol*. 2003;170 Pt 1:472–5.
7. Hsieh JT, Huang HE, Chen J, Chang HC, Liu SP. Modified plication of the tunica albuginea in treating congenital penile curvature. *BJU Int*. 2001;88:236–40.
8. Yachia D. Modified corporoplasty for the treatment of penile curvature. *J Urol*. 1990;143:80–2.
9. Bennett AH, Gittes RF. Congenital penile curvature without hypospadias. *Urology*. 1980;16:364–6.
10. Duckett JW. Hypospadias. *AUA Update Series*. 1993:130–5.
11. Tal R, Nabulsi O, Nelson CJ, Mulhall JP. The psychosocial impact of penile reconstructive surgery for congenital penile deviation. *J Sex Med*. 2010;7 Pt 1:121–8.
12. Marrocco G, Calisti A, Palmiotto F, Desimone P, Dimeo L. Congenital penile curvature in children – a practical approach. *Pediatr Surg Int*. 1995;10:40–3.
13. Hsieh JT, Liu SP, Chen Y, Chang HC, Yu HJ, Chen CH. Correction of congenital penile curvature using modified tunical plication with absorbable sutures: the long-term outcome and patient satisfaction. *Eur Urol*. 2007;52:261–6.
14. Salem EA. Modified 16-Dot plication technique for correction of penile curvature: prevention of knot-related complications. *Int J Impot Res*. 2018;30:117–21.
15. Lee SS, Meng E, Chuang FP, Yen CY, Chang SY, Yu DS, et al. Congenital penile curvature: long-term results of operative treatment using the plication procedure. *Asian J Androl*. 2004;6:273–6.
16. Basiri A, Sarhangnejad R, Ghahestani SM, Radfar MH. Comparing absorbable and nonabsorbable sutures in corporeal plication for treatment of congenital penile curvature. *Urol J*. 2011;8:302–6.
17. Hauck EW, Bschiepfer T, Diemer T, Manning M, Schroeder-Printzen I, Weidner W. Long-term results of Essed-Schroeder plication by the use of non-absorbable Goretex sutures for correcting congenital penile curvature. *Int J Impot Res*. 2002;14:146–50.
18. Ozkuvanci U, Ziylan O, Donmez MI, Yucel OB, Oktar T, Ander H, et al. An unanswered question in pediatric urology: the post pubertal persistence of prepubertal congenital penile curvature correction by tunical plication. *Int Braz J Urol*. 2017;43:925–31.
19. Yachia D. Re: An unanswered question in pediatric urology: the post pubertal persistence of prepubertal congenital penile curvature correction by tunical plication. *Int Braz J Urol*. 2018;44:411–2.