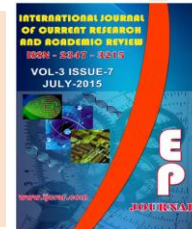




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Correction of hypospadias and chordee with combination of tubularized incised plate method and unilateral pedicle flap for repairing the skin defect

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A B S T R A C T

Hypospadias is one of the most intricate problems which urologists are dealing with in their practice and they always have been trying to propose and implant new methods and surgical techniques to achieve better outcomes. In this article we report a new modified method for Correction of hypospadias and chordee with combination of Tubularized Incised Plate (TIP) method which uses a unilateral pedicle flap for repairing ventral skin defect. Fifty patients having midshaft to distal hypospadias with superficial chordee were operated by this surgical technique; all of which were followed post surgically concerning early and late onset complications. The cosmetic appraisal of the results was performed by an independent urologist based upon photographs taken from the patients before and after the operation with a 1 to 10 scoring system after one year. The average age of the children was 17.44 ± 7.43 months and our average operative time was 52.50 ± 7.70 minutes. The average period of hospital stay for patients occurred to be 2.14 ± 1.10 days and our mean time of post surgical catheterization was 3.58 ± 0.94 days. The patients were followed for a mean time of 13.18 ± 5.15 months. Our final average cosmetic score was 9.27 ± 0.73 . In seven cases we experienced early and late complications including three coronal fistulas, two superficial skin infections and one subsequent dermal contracture and one dermal necrosis. We've had absolutely favorable results in these fifty patients with minimal post surgical complications.

Introduction

Hypospadias is one of the most common forms of congenital malformations with the prevalence of 1 in 300 live births (Nerli *et al.*, 2011; Baskin, 2000). Its etiology is

based upon uncompleted and deficient connection of the urethral folds during fetal growth which causes a defect in ventral aspect of the urethra (Wein *et al.*, 2012).

The word Hypospadias is driven from the Greek words Spadon meaning rupture and Hypo meaning the ventral aspect. In this malformation we have the urinary meatus positioned at the ventral aspect of the patient's penis instead of the tip of the penile glans, being in variable places from the tip of the penis to the perineum (Snodgrass *et al.*, 1998). The main goal of the correction of the hypospadias is to have a straight reconstructed penis and the correction of the chordee and having a normally positioned urinary meatus helping the patient to have a straight urinary flow and normal ejaculation during future coitus (O'Neill *et al.*, 1998; Walsh *et al.*, 1998).

More than 200 methods have been proposed for hypospadias repair so far in which some of them are one stage and some two stage operations. Nowadays the one step surgeries are more favorable due to their faster wound healing and superior results (Snodgrass, 1994). In reconstructive surgeries like the hypospadias repair the vascularity of the surgical field is one of the important pertaining matters which should always be beared in mind (Yang *et al.*, 2001; Wallis *et al.*, 2008), in order to supply the field with this vascularity we use sundry vascular flaps and grafts like dartos fascia flap or tunica vaginalis flap, these flaps which are applied as a second barrier layer around the neo-urethra besides the method of snodgrass have caused better surgical outcomes (Mustafa *et al.*, 2008).

In 1994 Snodgrass invented a new method for the repair of hypospadias called tubularized incised plate with the abbreviation of `TIP`. The new method was based upon a longitudinal incision on urethral plate and getting it widened in order to tubularize it on a urethral catheter and make a neo-urethra (Snodgrass, 1999; Oswald, 2000).

The main objectives of this research report a new modified method for Correction of hypospadias and chordee with combination of Tubularized Incised Plate (TIP) method which uses a unilateral pedicle flap for repairing ventral skin defect.

Patients and Methods

Patients: Fifty cases of one to three year old male patients with hypospadias and superficial chordee underwent consecutive surgical correction of their hypospadias after release of the chordee. All patients were chosen identically according to the Hadidi classification chart (Figure 1) in which all had non flat urethral plates (complete or partial), with superficial chordee and the meatus was located from midshaft to the distal penis except being on the glans and none of them had a past history of surgery for correction of hypospadias. All patients with the history of circumcision or any kind of operation on penis were excluded from the study.

Intervention: After induction of general anesthesia for all patients a circumcisional incision was performed and the incision lines were extended bilaterally with a 12 mm distance from each other on the urethral plate towards the urinary meatus. This incision was extended in a U-shaped fashion proximal to the meatus. After that the chordee was released with an extended dissection towards the proximal penis and all remaining chordee was released. The urethra was tubularized on an 8F nelaton catheter afterwards, then we performed an incision at dorsal mid prepuce and with the aid of subcuticular suture from the second layer of skin the ventral aspect of the repaired area was covered with this unilateral flap. The 8f nelaton catheter was fixed in place for 3 to 5 days and antibiotics and analgesics were prescribed for 1 week post surgically. Skin flaps came from

opposite site of the barrier flaps in order to prevent further penile shaft torsion. All of the patients were followed for at least 12 months, regarding the early and late onset complications. These complications include infection and bleeding as early onset complications, and fistulas, strictures and the need for more corrective operations as late onset problems. Figure 2 shows the technique of the surgery.

Finally the cosmetic appraisal of the results was performed by an independent urologist based upon photographs taken from the patients before and after the operation on a 1–10 scoring system.

Statistical analyses: Data were collected using a checklist and were analyzed using SPSS.17.0. Descriptive statistics were used to report the frequency, percents, mean, and standard deviation. Also we analyzed the data using chi-square test and mean difference test. $P < 0.05$ was considered significant.

Ethical considerations: All the requisite information regarding the operation was given to the parents of the children and a written consent was obtained, no extra charges were imposed on children due to the new operative method.

This study was registered to the Iranian registry of clinical trials with the registration code of: IRCT2014022216690N1.

Results and Discussion

Fifty male patients with hypospadias and superficial chordee underwent reconstructive surgery by this combined corrective method. Six patients had concomitant anomalies in which three of them underwent simultaneous surgery for their correction besides their hypospadias repair including left orchidopexy in two

cases and simultaneous bilateral herniorrhaphy in one case.

The mean age of the patients were 17.44 ± 7.43 months ranging from one to three years. The mean time of hospital stay was 2.14 ± 1.10 days. We had a mean 52.50 ± 7.70 minutes surgery time. The mean time of post surgical catheterization was 3.58 ± 0.94 days. All patients were followed for an average of 13.18 ± 1.15 months. Our mean final cosmetic score appeared to be 9.27 ± 0.73 .

Six cases had concomitant anomalies including left testicular torsion, lateral penile chordee, bilateral inguinal hernia, and bilateral retractile testes each in one case and left undescended testis in two cases. Three cases underwent simultaneous surgery for correction of bilateral inguinal hernia in one case and left orchidopexies in two cases. In seven cases we observed post surgical complications including two cases of dermal infections, coronal fistulas in three cases and thermal contracture, and necrosis each in one case.

Analyses showed that there was no significant difference in the mean age of the cases with simultaneous corrective surgeries for concomitant anomalies compared to the others ($P = 0.983$). Also no significant difference was observed in the operative time of the cases with simultaneous corrective surgeries for concomitant anomalies compared to the others ($P = 0.263$). Furthermore there were any significant differences in duration of post surgical hospitalization in cases with simultaneous surgery for concomitant anomalies compared to others ($P = 0.401$). Significant difference was not observed in duration of post-surgical catheterization period in cases with concomitant anomalies compared to others ($P = 0.107$).

The mean final cosmetic score of the cases with concomitant anomalies and the ones with subsequent post operative complications was significantly lower than the rest of the patients (P=0.031).

No significant difference was observed in final cosmetic score of the cases who underwent simultaneous surgery for concomitant anomalies compared to the others (P=0.294).

The mean duration of the post surgical catheterization was significantly longer in cases with simultaneous corrective surgery and in patients who came up with subsequent post-surgical complications (P=0.006).

One of the encountered problems was the size of pediculated flap in some of the patients which caused no difficulty and they had subsequent normal voiding and will have no problem with their future erections and this could only be deemed to be a minor shortcoming from the cosmetic standpoint.

Figure 3 shows the Post operative status in one of the patients.

In this research we report a new modified method for Correction of hypospadias and chordee with combination of Tubularized Incised Plate (TIP) method which uses a unilateral pedicle flap for repairing ventral skin defect. We used this method for the hypospadias repair in our own patients accordingly, which had very acceptable consequences.

The repair of hypospadias by TIP method which was first presented by Snodgrass in 1994, was rapidly popularized due to its acceptable final outcomes (Snodgrass, 1994; Shanberg *et al.*, 2001; Al-Sayyad *et al.*, 2007). As mentioned before in every reconstructive surgery like the hypospadias

repair the vascular supply of the surgical field is one of the essential requirements affecting the final outcome (Mustafa, 2005). The most common latent complication of such repair is urethro-cutaneous fistulas which make it mandatory to apply a new vascular barrier flap between skin and the urethra (Djordjevic *et al.*, 2006; Jayanthi, 2003).

Several techniques have been used to reach this goal like the `Durham` technique of `Pants Over Vest` in which a de-epithelialized skin flap is applied over the neo-urethra (Wallis *et al.*, 2008; Smith, 1973).

Yerkes used corpus cavernosa to reinforce the neo-urethra (Yerkes *et al.*, 2000) and Kirkali used a pediculated tunica vaginalis flap to supply the vascularity of the neo-urethra (Kirkali, 1990). Retik and Borer (1998) used dartos flap to fortify the neo urethra. In 111 cases in which France used combination of the TIP method and dartos flap to repair the hypospadias he had a 98% success rate with only two cases who developed later cutaneous fistulas (Furness and Hutcheson, 2003). Also Mustafa also used the TIP method with combination of dartos flap in 26 cases with hypospadias and experienced no later complications including fistulas (Mustafa *et al.*, 2008). In Y WJ's report of the repair of hypospadias in 53 cases by the combination of TIP method with buccal mucosal grafts fortified by dartos barrier flaps there were only a 15% of cases with late complications including five fistulas and three cases with meatal stenosis (Ye *et al.*, 2008). In a research conducted by Chatterjee and colleagues, Twenty patients underwent the repair with combination of the TIP method and dartos flap which had a 15% rate of latent fistulas but in three patients operated with tunica vaginalis flaps no consequent complications were observed (Chatterjee *et al.*, 2004).

Koeing and colleagues they evaluated the outcomes of hypospadias repair with mobilization of the urethral plate and concluded that it had better cosmetic outcomes with lower rate of later complications (Koenig *et al.*, 2013).

Our results indicated acceptable cosmetic outcomes by using TIP method and our final cosmetic score occurred to be 9.27 ± 0.73 . In a study conducted by Molaiyan and colleagues in department of pediatric surgery in Tehran University of medical sciences, they concluded that none of their patients experienced later fistulas in hypospadias repair by TIP method (Mollaeian *et al.*, 2008). In another survey done by Tovenchien L. et al in urology department of the University of Sirkit they concluded that TIP is a gold standard method in hypospadias repair (Tonvichien *et al.*, 2003). Also Tiryaki concluded in his research that repair of hypospadias with combination of TIP method with a skin flap in a one-stage surgery had a 26% overall complication rate with no secondary chordees and only 20% of latent fistulas (Tiryaki, 2010).

In our study the overall complication rate occurred to be 14% during hospitalization and follow up period comparing to the aforementioned study. Results of another survey in line with our study conducted by Ghali et al in Mansora university of Egypt indicated that the complication rate occurred to be 22% and overall success rate was 95% (Ghali, 1999).

Finding from our study showed that the overall complication rate occurred to be 14% during the hospitalization and follow up period comparing to the aforementioned study. Which was in line with another study conducted by Ziada et al in urology department of the Maada University in

Cairo, Egypt, concluding that the hypospadias repair by TIP method had acceptable cosmetic outcomes (Ziada *et al.*, 2006).

Cook et al concluded in their article that the hypospadias repair by TIP method is the gold standard technique for correction of mid shaft defects (Cook *et al.*, 2005). Also a research conducted by Smith et al in urology department of Tennessee university concluded that TIP method had acceptable cosmetic outcomes in correction of midshaft and distal hypospadias (Smith, 2001).

In a survey performed by Nagai and colleagues, the results of one step surgical correction of hypospadias with concomitant chordee with the method of paramental foreskin flap was analyzed and they concluded that this method was absolutely favorable due to its lesser complications and shorter surgery time (Nagai *et al.*, 2005).

Another research performed by Abolvafa and colleagues which was aimed at evaluating the TIP method in hypospadias repair, indicated that this method was suitable for the repair of a wide range of different types of hypospadias with the least subsequent complications (Abualwafa, 2006).

Mousavi and coworkers performed a similar survey on 60 patients to evaluate the surgical outcome of the TIP method on patients with hypospadias and they have shown that one of the most prevalent complications of this method is fistula being detected in 10-25% of cases post surgically and they concluded that the TIP method is an absolutely unique technique due to its fast and favorable cosmetic outcomes and could be an ideal alternative to the previous surgical methods (Baskin, 2000).




Figure.1 Hadidi classification chart for hypospadias

Name of the patient:




Date of birth:

Relevant personal details:



1. Site of urethral meatus (before chordee correction)

Glanular Hypospadias  Distal Penile Hypospadias  Proximal Hypospadias 




2. Site of urethral meatus (after chordee correction)

Glanular Hypospadias  Distal Penile Hypospadias  Proximal Hypospadias 




3. Prepuce

Complete  Incomplete 



4. Glans

Cleft  Incomplete cleft  Flat 



5. Chordee

No chordee  Superficial chordee  Deep chordee 

6. Urethral plate width

<1cm  ≥1cm 

7. Penile torsion

No torsion  Present 

8. Scrotal transposition



No transposition  Present 

Figure.2 Photography showing technique of the surgery

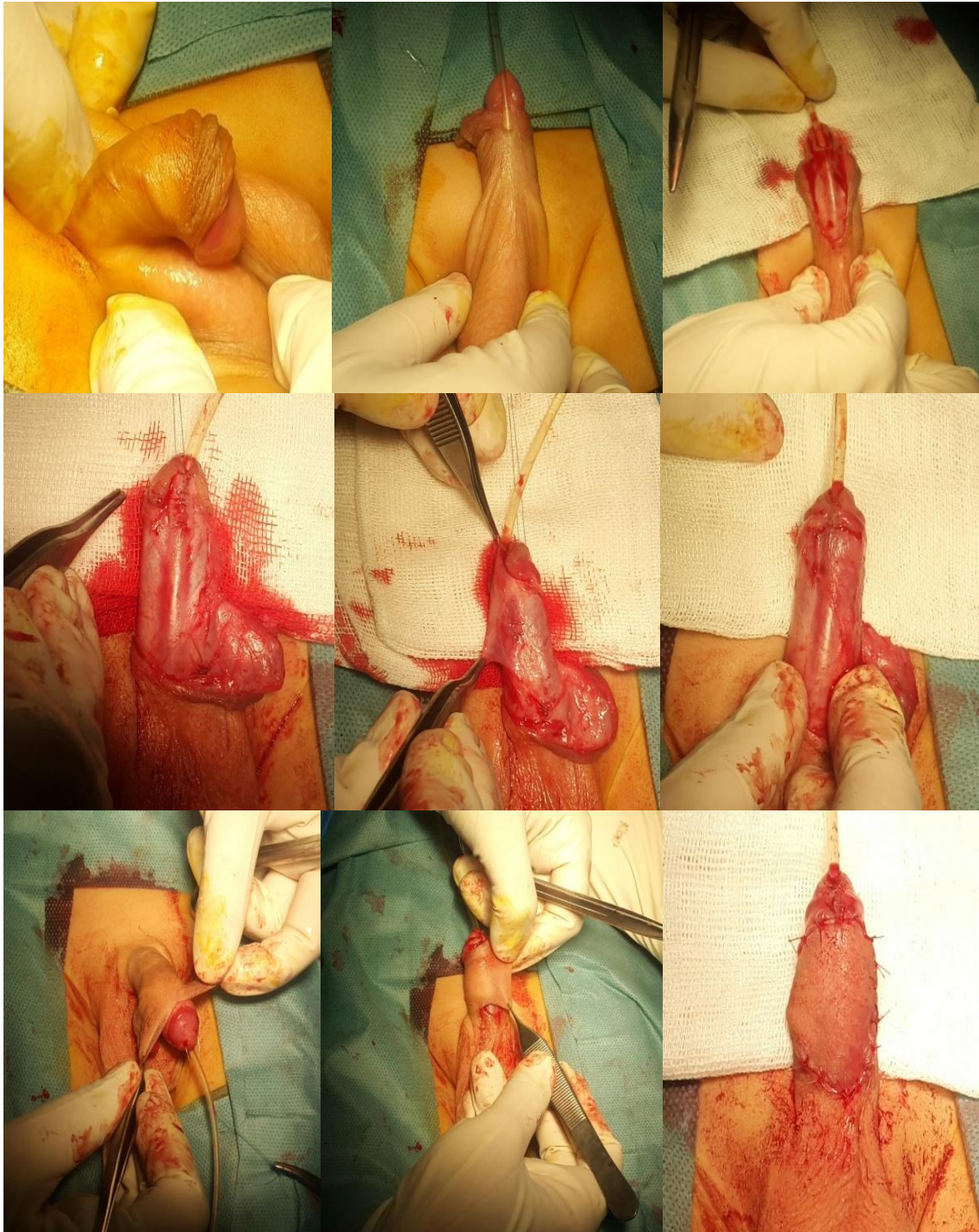


Figure.3 Post operative status in one of the patients



Regarding the fact that none of our patients had a deep chordee at the urethral plate, adhesions were released with extensive dissection, and release of the penile shaft skin and the urethra was reconstructed by TIP method afterwards.

Like all other cases the urethra was reinforced by a secondary dartos layer in order to prevent later fistulas, but regarding the fact that using a ventral dartos flap would increase the chordee, we used a unilateral flap.

Contra lateral skin flaps were used in order to repair skin defects to prevent occurrence of any penile shaft torsion.

Conclusion

We've had absolutely favorable results in these fifty patients regarding post surgical complications. We had three coronal fistulas and the only problem with the flaps was the size of pediculated flaps in some of the patients which caused no difficulty and they had normal voiding and will have no problem with their future erections and this could only be deemed a minor shortcoming from the cosmetic standpoint.

In all follow-ups at the first 12 months the cosmetic scores were more than 9 from 10.

Considering these results in compared to similar studies, and the low rate of post surgical complications, this method is suggested for the similar hypospadias correction.

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References

- Abualwafa, A. 2006. Modified Tubularized Incised Plate (TIP) hypospadias repair using dartos fascia flap, Egypt. *J. Plast. Reconstr. Surg.*, 30(2): 139–42.

- Al-Sayyad, A., Pike, J., Leonard, M. 2007. Redo hypospadias repair: experience at a tertiary care children's hospital. *Can. Urol. Assoc. J.*, 1(1): 47–51.
- Baskin, L. 2000. Hypospadias and urethral development. *J. Urol.*, 163(3): 951–6.
- Chatterjee, U., Mandal, M., Basu, S., Das, R., 2004. Comparative study of dartos fascia and tunica vaginalis pedicle wrap for the tubularized incised plate in primary hypospadias repair. *BJU. Int.*, 94(7): 1102–4.
- Cook, A., Khoury, A., Neville, C., Bagli, D., Farhat, W., Pippi Salle, J. 2005. A multicenter evaluation of technical preferences for primary hypospadias repair. *J. Urol.*, 174(6): 2354–7.
- Djordjevic, M., Perovic, S., Slavkovic, Z., Djakovic, N. 2006. Longitudinal dorsal dartos flap for prevention of fistula after a Snodgrass hypospadias procedure. *Eur. Urol.*, 50(1): 53–7.
- Furness, P., Hutcheson, J. 2003. Successful hypospadias repair with ventral based vascular dartos pedicle for urethral coverage. *J. Urol.*, 169(5): 1825–7.
- Ghali, A. 1999. Hypospadias repair by skin flaps: a comparison of onlay preputial island flaps with either Mathieu's meatal-based or Duckett's tubularized preputial flaps. *BJU. Int.*, 83(9): 1032–8.
- Jayanthi, V. 2003. The modified Snodgrass hypospadias repair: reducing the risk of fistula and meatal stenosis. *J. Urol.*, 170(4 Pt 2): 1603–5.
- Kirkali, Z. 1990. Tunica vaginalis: an aid in hypospadias surgery. *Br. J. Urol.*, 65(5): 530–2.
- Koenig, J., Kottwitz, M., McKenna, P. 2013. Urethral mobilization for distal and mid shaft hypospadias with chordee. *J. Urol.*, 190(4 Suppl): 1545–8.
- Mollaeian, M., Sheikh, M., Tarlan, S., Shojaei, H. 2008. Urethral mobilization and advancement with distal triangular urethral plate flap for distal and select cases of mid shaft hypospadias: experience with 251 cases. *J. Urol.*, 180(1): 290–3.
- Mustafa, M. 2005. The concept of tubularized incised plate hypospadias repair for different types of hypospadias. *Int. Urol. Nephrol.*, 37(1): 89–91.
- Mustafa, M., Wadie, B., Abol-Enein, H. 2008. Dorsal dartos flap in Snodgrass hypospadias repair: how to use it? *Urol. Int.*, 81(2): 215–7.
- Nagai, A., Nasu, Y., Watanabe, M., Kusumi, N., Tsuboi, H., Kumon, H. 2005. Clinical results of one stage Urethroplasty with paramental foreskin flap for hypospadias. *Acta Med. Okayama*, 59(2): 45–8.
- Nerli, R., Neelagund, S., Guntaka, A., Patil, S., Hiremath, S., Jali, S. 2011. Staged buccal mucosa urethroplasty in reoperative hypospadias. *Indian J. Urol.*, 27(2).
- O'Neill, J., Mark, I., Jay, I., Grosfeld, J., Enic, W., Arnold, G. 1998. Pediatric surgery. Missouri Mosby Company.
- Oswald, J. 2000. Comparison of the perimeatae-based flap and tubularized incised-plate urethroplasty in primary distal hypospadias. *BJU*, 85(6).
- Retik, A., Borer, J. 1998. Primary and reoperative hypospadias repair with the Snodgrass technique. *World J. Urol.*, 16(3): 189–91.
- Shanberg, A., Sanderson, K., Duel, B. 2001. Re-operative hypospadias repair using the Snodgrass incised plate urethroplasty. *BJU Int.*, 87(6): 544–7.
- Smith, D. 1973. A de-epithelialised overlap flap technique in the repair of

- hypospadias. *Br. J. Plast. Surg.*, 26(2): 106–14.
- Smith, D. 2001. A comprehensive analysis of a tubularized incised plate hypospadias repair. *Urology*, 57(4): 778–81.
- Snodgrass, W. 1994. Tubularized incised plate urethroplasty for distal hypospadias. *J. Urol.*,
- Snodgrass, W. 1999. TIP hypospadias repair technique, results, and commonly asked questions. *Newsletter*, 1(3).
- Snodgrass, W., Koile, M., Manzoni, G., Horowitz, R., Coldamone, A. 1998. Tubularized incised plate hypospadias for proximal hypospadias. *J. Urol.*, 1998: 2129–31.
- Tiryaki, T. 2010. Combination of tubularized island flap and ventral skin flap techniques in single-stage correction of severe proximal hypospadias. *Urol. Int.*, 84(3): 269–74.
- Tonvichien, L., Niramis, R. 2003. Tubularized, incised plate urethroplasty in hypospadias repair: experience at Queen Sirikit National Institute of Child Health. *J. Med. Assoc. Thai.*, 86(3): S522–30.
- Wallis, M., Braga, L., Houry, A. 2008. The role of flaps and grafts in modern hypospadiology. *Indian J. Urol.*, 24(2): 200–5.
- Walsh, P., Petic, A., Vaughan, E., Wein, A. 1998. *Campbell's urology*. W.B Saunders Company, Philadelphia.
- Wein, J., Kavoussi, R., Novick, A., Partin, W., Peters, A. 2012. *CAMPBELL-WALSH Urology*, 10th edn. W.B Saunders Company, Philadelphia.
- Yang, S., Chen, S., Hsieh, C., Chen, Y. 2001. Reoperative Snodgrass procedure. *J. Urol.*, 166(6): 2342–5.
- Ye, W., Ping, P., Liu, Y., Li, Z., Huang, Y. 2008. Single stage dorsal inlay buccal mucosal graft with tubularized incised urethral plate technique for hypospadias reoperations. *Asian J. Androl.*, 10(4): 682–6.
- Yerkes, E., Adams, M., Miller, D., Pope, J., Rink, R., Brock, J. 2000. Y-to-I wrap: use of the distal spongiosum for hypospadias repair. *J. Urol.*, 163(5): 1536–8.
- Ziada, A., Morsi, H., Aref, A., Elsaied, W. 2006. Tubularized incised plate (TIP) in previously operated (redo) hypospadias. *J. Pediatr. Urol.*, 2(5): 409–14.