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INTRASCROTAL INCISION: AN ALTERNATIVE TECHNIQUE FOR THE MANAGEMENT OF INGUINOSCROTAL PATHOLOGIES, EXPERIENCE FROM 76 CASES

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Abstract. Introduction: *The aim of this clinical study was to present our experience gained by using the intrascrotal incision through the mid raphe for the management of a variety of inguinoscrotal pathologies.* ***Materials and Methods:*** *A total of 76 male patients, between 2 and 16 years, underwent surgical treatment through a mid raphe intrascrotal incision, for a wide range of inguinoscrotal diseases, including torsion of the spermatic cord, torsion of the testicular appendages, non-communicating hydrocele, communicating hydrocele, ectopic testis, retractile testicles, palpable undescended testis, testicular trauma and testicular prosthesis placement.* ***Results:*** *All the patients had an uneventful postoperative recovery, with none mentioned complication, and none of them required convention to the traditional inguinal method. The follow-up examination ranged from 6 months to 3 years, with no surgical complication highlighted.* ***Conclusions:*** *We recommend that the intrascrotal incision through the mid raphe may be considered as an alternative technique to inguinoscrotal pathologies, instead of other approaches. The ability to treat a variety of pathologies regarding both two hemi-scrotums and the inguinal region at the same time, the provision of adequate surgical site, while succeeding much less dissection and disruption of tissue, the excellent cosmetic result, the greater comfort for the 'day-case' child, the ability to use the scrotal septum in order to fix the testis in the scrotum and the avoidance of an extra incision are the main advantages of the intrascrotal incision.*

Key words: *intrascrotal incision, midline incision, mid raphe orchiopexy, inguinoscrotal pathologies*

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INTRODUCTION

Intrascrotal incision through the mid raphe may be considered as an alternative technique to inguinoscrotal pathologies, instead of other approaches, which include the laparoscopic approach, the inguinal incision, the high single scrotal incision (Bianchi) and the circumcision incision – as described by M. Chua et al for palpable, low inguinal undescended testes [1].

According to similar studies related to the intrascrotal incision, the approach has been used for the surgical management of inguinal hernia, webbed penis, scrotal exploration, tumors of the inguinoscrotal area and testicular biopsy [2, 3, 4].

We report our experience from 76 patients operated using a vertical intrascrotal incision, through the mid raphe for the management of inguinoscrotal pathologies. At the same time, after systematic and comprehensive review of the relevant international literature, the wider range regarding the type of the performed procedures is documented.

MATERIALS AND METHODS

This was an observational study. All patients included in the study were referred to our hospital for the management of inguinoscrotal pathologies during a specific period of time – between January, 2018 and December, 2018. The patients were treated by a one and the same surgical team led by Dr Patoulias Ioannis.

A total of 76 boys aged between 2 and 16 years underwent surgery for inguinoscrotal pathologies, through a vertical intrascrotal incision (Figure 1).

Eight out of 76 (8/76) patients, aged 12 years, suffered a spermatic cord torsion. The surgical management included detorsion, testicular fasciotomy by making a longitudinal incision of the tunica albuginea for the prevention of the testicular compartment syndrome, and bilateral orchiopexy by fixing the lateral surface of the testis on the intrascrotal septum (Figures 2, 3).

Twelve out of 76 (12/76) patients suffered torsion of the testicular appendage, where the torsed appendage was excised through an intrascrotal incision.

A total of 4 out of 76 (4/76) patients were operated due to communicating hydrocele. High ligation of the processus vaginalis and creation of a “window” through the tunica vaginalis was performed.

Four out of 76 (4/76) patients underwent surgical operation due to non-communicating hydrocele. Inversion of the tunica vaginalis and orchiopexy of the homolateral testis was performed.

One out of 76 (1/76) patients was operated because of testicular trauma. The surgical management included inspection of the intratesticular structures, control of the bleeding and drainage of the hematoma. Two penrose drain tubes were positioned respectively with the upper and lower pole of the homolateral testis (Figure 4).

A total of 34 out of 76 (34/76) patients suffered palpable undescended testis, where Bianchi procedure and fixation of the testis on the scrotal septum was performed.

Ten out of 76 (10/76) patients had and ectopic testis. The surgical steps included dissolution of the fibrous adhesions to the height of the external inguinal ring, inspection for an open processus vaginalis (negative) and placement of the unilateral testicle in a pouch between the scrotum and the dartos (sub-dartos pouch) (Figure 5).

A total of 3 out of 76 (3/76) patients had a testicular prothesis placement, where preparation and expansion of the scrotum, for the prothesis placement without tension, was performed (Figure 6).

Table 1. List of inguinoscrotal pathologies where the intrascrotal incision was applied, number of patients and chosen surgical technique

Disease	Number of patients	Surgical treatment
Torsion of the spermatic cord	8	Detorsion, prevention of the testicular compartment syndrome, bilateral orchiopexy
Torsion of the testicular appendages	12	Excision of the torsed appendage
Adult-type hydrocele	4	Inversion of the tunica vaginalis
Communicating hydrocele	4	High ligation of the processus vaginalis
Testicular trauma	1	Inspection of the intratesticular structures, control of the bleeding and drainage of the hematoma
Ectopic testis	10	Orchiopexy
Palpable undescended testis	34	Bianchi procedure and fixation of the testis on the scrotal septum
Testicular prothesis placement	3	Preparation and expansion of the scrotum, for the prothesis placement without tension

Fig. 1. Intrascrotal (vertical) incision through the midline raphe

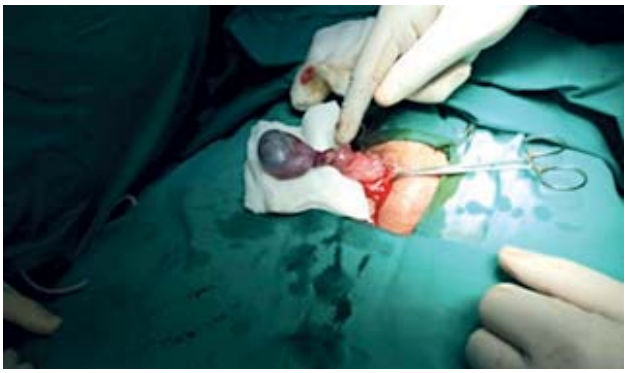

Fig. 2. Torsion of the testicular cord

Fig. 3. Bilateral orchiopexy through one intrascrotal incision

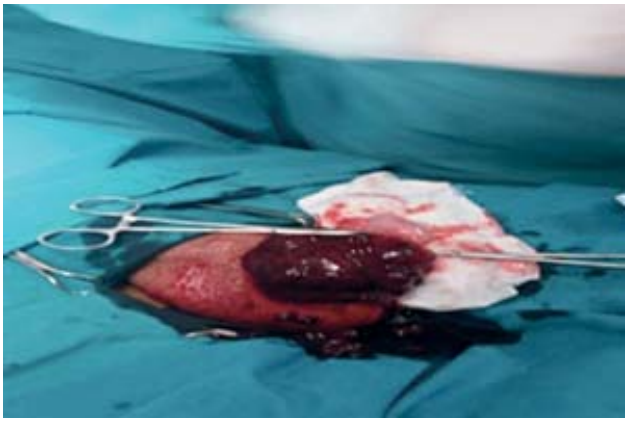

Fig. 4. Testicular trauma

Fig. 5. Check for an open processus vaginalis

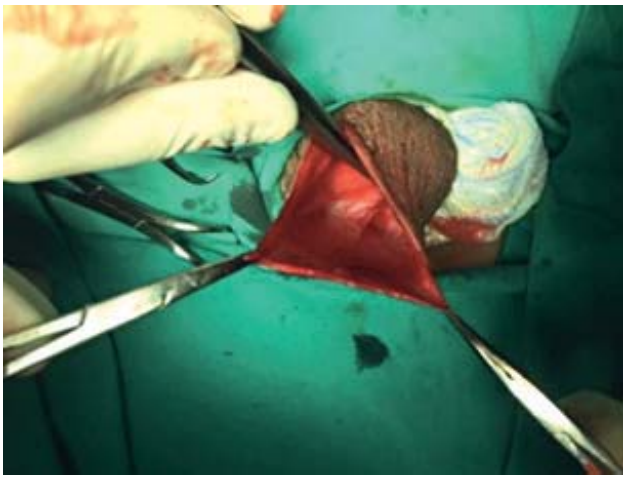

Fig. 6. Expansion of the scrotum, for the prothesis placement without tension

RESULTS

All the patients had an uneventful postoperative recovery. Besides the patient with the testicular trauma, the rest were discharged from the hospital on the first postoperative day. None of the patients required convention to the traditional inguinal method. The follow-up period ranged from 6 months to 2 years, with no surgical complication noted. The aesthetic result of the incision was considered satisfactory (Figures 7, 8, 9).

DISCUSSION

It is worth highlighting that the laparoscopic approach has a limited use, in the inguinal pathologies, and therefore cannot be applied in scrotal pathologies, such as testicular torsion, testicular prothesis placement and trauma of the testes.

Moreover, laparoscopic hydrocelectomy has been reported, but the operation time was longer than that of

Fig. 7, 8. The intrascrotal incision postoperatively, after suture placement

Fig. 9. Intrascrotal incision during follow-up. Excellent cosmetic result

scrotal hydrocelectomy and the incision scars were more noticeable than that of the scrotal approach. Also, the cost it incurred was higher than that of the scrotal approach [5, 6].

The circumcision incision technique is available for patients who undergo orchidopexy and request or have indications for circumcision performance, in the same setting.

However, it is a restricted method, due to its limited use in concurrent circumcision and palpable, low inguinal undescended testes and the need for great experience [1].

The conventional inguinal approach is still preferred in the management of high inguinal undescended testis, as it allows better retroperitoneal mobilization of the testicular vessels, such that their new and straighter course towards the scrotum permits additional testicular descent. The basic principles of this method involve making a second scrotal incision to place the testis in a dependent sub- dartos pouch without tension. That means that it requires two standard skin incisions, while in contralateral inguinal hernias the number of the incisions is doubled. This results in longer operative time, lower cosmetic results and higher rates of postoperative pain.

The high single scrotal incision is similar to the intrascrotal incision, as regards to the success rate and the postoperative results. As described by Seong Woong Na et al., the success rate in the single incision orchiopexy group was as high as 92.5% (135/146 testes). Only 11/ 107 patients required conversion to traditional inguinal incision orchiopexy or had postoperative complications (scrotal hematoma, wound dehiscence), in comparison to the traditional inguinal incision orchiopexy group, which was 96.5% (136/141 testes) [7]. Parson JK et al. describes that only 20% of the patients (out of 56 patients) required concomitant inguinal hernia repair through a standard inguinal incision [3]. Bianchi and Squire reported a 95.8% success rate while they performed a single scrotal incision orchiopexy in 120 patients [8]. Dayanc et al. evaluated the success rate with or without inguinal hernia in patients with an undescended testis within the inguinal canal or beyond the external inguinal ring. Scrotal orchiopexy had a success rate of 97.6% in the distal to the external inguinal ring group, while only 1/34 patients required conversion to traditional inguinal incision. The success rate in the within the inguinal canal group was 89.7%, while 3/ 22 cases needed additional groin incision [9]. This means that a palpable undescended testis may be surgically relocated into the dependent scrotum without sacrificing the traditional principles of orchiopexy [10]. The main reason for conversion remains the insufficient length of cord. It is suggested that when the testis is located in the inguinal canal or higher, a traditional inguinal incision should be considered before the operation.

A possible controversy regarding the scrotal approach is whether the dissection is high enough to easily allow for adequate lengthening of the cord and placement of the testis into the scrotum without tension. Also, there is concern that a single scrotal approach may not allow sufficient ligation of the processus vaginalis to avoid hernia or hydrocele formation after the operation. However, the majority of the undescended testes are palpable distal to the inguinal canal.

Furthermore, in the pediatric age group, the inguinal canal is short, with the internal and the external rings almost superimposed to one another. This couple with the relative morbidity of the skin in the inguinal region allows retraction of the skin incision, thereby enabling dissection through the scrotum without opening the inguinal canal. Moreover, palpable undescended testes appear to be held up by a shorter than normal processus vaginalis that often has high insertion, as observed by Bianchi and Squire in 1989.

When additional cord length is required, additional dissection through the scrotal incision is possible, by opening the external inguinal ring and canal, as we have already performed in cases of cryptorchidism.

According to these facts, the scrotal incision is considered adequate for orchidopexy in most palpable undescended testes.

In addition to that, it is possible to successfully correct other inguinoscrotal abnormalities by using the scrotal incision method, such as hernia and hydrocele, as it gives such excellent access to the processus vaginalis, external inguinal ring and inguinal canal [2, 7, 11].

Another controversy is whether the older the patient, the higher the failure rate of high scrotal orchidopexy in terms of successful placement of the testis in a dependent position in the scrotum. According to a study of Talabi et al., the increasing age of patients and location of palpable undescended testes had no influence on successful placement of the testes into the scrotum via both scrotal and inguinal technique [12].

The scrotal incision is also considered preferable in redo orchidopexy procedure in cases of recurrent and iatrogenic undescended testes, after primary traditional orchiopexy, as it allows early entry into unscarred, previously unexplored layer of the canal, which allows a safer mobilization of the testis and then the cord [13].

A scrotal incision is associated with shorter operative time, less postoperative pain, no added morbidity and improved cosmetic outcomes.

As for the noted complications, theoretically these include transient scrotal oedema, wound hematoma, and testicular renascent, which had no significant difference while using the traditional orchiopexy. Our patients had an uneventful postoperative recovery, with none of the mentioned complications, and none of them required convention to the traditional inguinal method.

The main difference of the intrascrotal incision, compared to the high single scrotal incision, is that the second one requires two incisions for contralateral pathologies, on the contrary to the intrascrotal approach, that allows the examination and repair of the impairment through one mid raphe incision, which allows access to both sides of the scrotum. Additionally, there is a minimal chance, though, of injuring the superficial branches of the genitofemoral and the ilioinguinal nerves, using the high single scrotal incision [14].

As for the testicular prothesis placement, after systematic and comprehensive review of the relevant literature, we did not find a similar study. Traditionally, the specific procedure is established through an inguinal incision. In our opinion, the intrascrotal incision facilitates the exploration of the unilateral scrotum and inguinal region, enables the expansion of the unilateral hemi-scrotum for the prothesis placement, while at the same time allows the performance of preventive orchiopexy of the bilateral testis.

Initially, we managed four cases of testicular torsion using the intrascrotal incision. These cases encouraged us to broaden the use of this technique in a range of inguinoscrotal pathologies, as we believed it was possible, from a surgical and technical aspect.

The main disadvantages of our study are:

1. The relatively limited number of patients we managed, although greater than most of the corresponding studies in the recent literature [4].
2. The restricted period of time, this study refers to.
3. Finally, this is an observational study, thus it lacks the compared results of a double-blind study.

CONCLUSIONS

The results of our study show that the intrascrotal incision may be used in the following pathologies: torsion of the spermatic cord, appendiceal torsion, adult-type hydrocele, communicating hydrocele, ectopic testis, retractile testicles, palpable undescended testis, testicular trauma and testicular prosthesis placement.

The advantages that encouraged us to use the intrascrotal incision as the technique of choice are:

1. The ability to treat a variety of pathologies regarding both two hemi scrotum and the inguinal region at the same time.
2. The provision of adequate surgical field, while succeeding much less dissectonal tissue disruption.
3. The excellent cosmetic result.
4. The greater comfort for the ‘day-case’ child
5. The ability to use the intra scrotal septum in order to fix the testis in the scrotum and the avoidance of an extra incision.

Finally, besides the disadvantages mentioned above, we believe that the number of cases described, being greater than most of the relative studies of the recent literature, are reliable and valuable.

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