



ROLE OF PREOPERATIVE INJECTION BETA-HCG IN OPEN ORCHIOPEXY FOR INTRAPERITONEAL UNDESCENDED TESTES – AN EXPERIENCE OF FIVE CASES FROM PERIPHERAL TERTIARY HEALTHCENTRE WITH REVIEW OF LITERATURE

Paediatric Surgery

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ABSTRACT

Introduction: Cryptorchidism, or undescended testes (UDT) is defined as the failure of normal descent of the one or both testis into the scrotum. It is one of the most common congenital anomalies in male infants, with an estimated incidence of 1–3% in full-term neonates and up to 30% in preterm infants. Among these, 20–30% of cases involve non-palpable testes, which can be located intra-abdominally, inguinally, or absent altogether. [1] A normal functioning hypothalamic-pituitary-testicular (HPT) axis is essential for the testicular descend. [2] About 70% of UDT descend spontaneously till 1 year of age, especially before 3 months age, after which spontaneous descend is highly unlikely.[3] The management of non-palpable testes is essential to prevent complications such as infertility, testicular atrophy, testicular torsion, malignancy.[1,4] Human chorionic gonadotropin (hCG), a hormone that mimics the luteinizing hormone (LH), has been proposed as a therapeutic option to stimulate testicular descent in cases of cryptorchidism. Beta-hCG injections are used to trigger testosterone production in Leydig cells, potentially facilitating testicular descent especially in low lying testis in the inguinal canal or close to it. However, the efficacy of this approach, particularly in cases of intraperitoneal non-palpable testes, remains controversial, with success rates varying widely across studies. [5,6] Laparoscopic orchiopexy remains the standard treatment for non-palpable testes, hormonal therapy can be used as an adjunct to the open orchiopexy in selected cases of palpable UDT, lying close to the deep inguinal ring (DIR), especially in resource limited peripheral settings where, laparoscopic procedures are not possible due to unavailability of instruments and expertise. This case series aims to evaluate the role of Beta-hCG injection as an adjunct in the management of intraperitoneal undescended testes mostly at or around the DIR enhancing the efficacy, safety, and providing insights into optimizing open orchiopexy procedure in the resource limited rural settings.

KEYWORDS

Beta-hCG, Intraperitoneal testes, Undescended testes (UDT), Open Orchiopexy, Deep inguinal ring (DIR), Hormonal therapy

INTRODUCTION:

Cryptorchidism, or undescended testes (UDT) is defined as the failure of normal descent of the one or both testis into the scrotum. It is one of the most common congenital anomalies in male infants, with an estimated incidence of 1–3% in full-term neonates and up to 30% in preterm infants. Among these, 20–30% of cases involve non-palpable testes, which can be located intra-abdominally, inguinally, or absent altogether. [1] A normal functioning hypothalamic-pituitary-testicular (HPT) axis is essential for the testicular descend. [2] About 70% of UDT descend spontaneously till 1 year of age, especially before 3 months age, after which spontaneous descend is highly unlikely.[3] The management of non-palpable testes is essential to prevent complications such as infertility, testicular atrophy, testicular torsion, malignancy.[1,4]

Human chorionic gonadotropin (hCG), a hormone that mimics the luteinizing hormone (LH), has been proposed as a therapeutic option to stimulate testicular descent in cases of cryptorchidism. Beta-hCG injections are used to trigger testosterone production in Leydig cells, potentially facilitating testicular descent especially in low lying testis in the inguinal canal or close to it. However, the efficacy of this approach, particularly in cases of intraperitoneal non-palpable testes, remains controversial, with success rates varying widely across studies. [5,6]

Laparoscopic orchiopexy remains the standard treatment for non-palpable testes, hormonal therapy can be used as an adjunct to the open orchiopexy in selected cases of palpable UDT, lying close to the deep inguinal ring (DIR), especially in resource limited peripheral settings where, laparoscopic procedures are not possible due to unavailability of instruments and expertise. This case series aims to evaluate the role of Beta-hCG injection as an adjunct in the management of intraperitoneal undescended testes mostly at or around the DIR enhancing the efficacy, safety, and providing insights into optimizing open orchiopexy procedure in the resource limited rural settings.

Materials And Methodology:

The cases discussed here were admitted in the department of paediatric surgery of Baba Raghav Das (BRD) medical college, Gorakhpur, Uttar Pradesh between the time period of January 2024 to September 2024.

All the patients presented with their parents with chief concern of non-palpable testis in the scrotum. Patients were admitted and thorough physical clinical examination alongwith radiological evaluation with USG of whole abdomen done to diagnose UDT and to locate the intraperitoneal testis. In all these cases, testis was located close/just deep to the deep inguinal ring (DIR).

After explaining the prognosis and taking proper consent, injection beta-hCG was administered via deep intramuscular route twice weekly for 5 weeks as per age adjusted dosage as mentioned below

<2 Years: 250 U
2-8 Years: 500 U
>8 Years: 1000 U

After the total 10 doses, all patients were re-examined for clinical confirmation of any descent, fresh ultrasound inguino-scrotal region done to evaluate the size, vascularity and position of testis. Post-operative all the patients were followed up at 3 weeks, 6 weeks and 6 months.

Surgical Technique: After a total 10 doses of beta-hCG injection given biweekly for 5 weeks, patient is taken up for the surgery. Patient kept supine, under general anesthesia. Main operating surgeon standing at the affected side with the assistant surgeon at the unaffected side. A horizontal incision made over the inguinal canal of the affected side. Careful layerwise dissection done followed by retroperitoneal mobilization of testis. Herniotomy was done. A medium artery forceps is introduced through the external inguinal ring and exteriorised from the dependent part of scrotum by incising the scrotal skin. Testis was then retrieved from intraperitoneal site to the DIR and via inguinal canal to the scrotum by traction on the gubernaculum with artery forceps. The mobilized testis placed in subdartos pouch. Inguinal incision closed by subcuticular suturing and scrotal skin by simple suturing. No drain was used.

Case 1:

A 10 months old male child presented with left UDT and reducible left congenital inguinal hernia. After thorough clinical and radiological examination the left testis identified to be located intraperitoneally

deep to the DIR.

Patient was given injection beta-hCG 250 U intramuscular twice a week for 5 weeks (total 10 doses) before surgery. Left testis become marginally palpable before the surgery. Surgical management by left testis mobilization via transverse left inguinal incision and left orchiopexy with left herniotomy under general anesthesia (GA) was done. Post-operative period was uneventful and the patient was discharged on POD-4. At 6 months follow up patient is doing well and repeat scrotal USG shows normal testicular growth with normal vascularity.

Case 2:

A 1.5 years old male child with bilateral UDT presented to us at the OPD. At clinical examination, scrotum was empty with bilaterally non-palpable testis. USG whole abdomen revealed both testis to be intraperitoneal deep to the DIR.

Patient started on the injection beta-hCG 250 U intramuscular twice a week for 5 weeks (total 10 doses) before surgery. After 5 weeks, bilateral testis become slightly palpable before the surgery. Patient underwent open bilateral orchidopexy and hernia Tommy under GA with no post-op complications and patient was discharged on POD-6. At 6 months follow up the patient is doing well and repeat bilateral inguino-scrotal USG shows normal testicular growth with normal vascularity.

Case 3:

A 4 years old male child with right side nonpalpable testis presented to our OPD. After thorough clinical and radiological evaluation, right testis found to be located deep to the DIR. Patient started on injection beta-hCG 500 U intramuscular twice a week for 5 weeks (total 10 doses) after which the patient underwent open right orchidopexy and herniotomy surgery under GA. Patient was discharged on POD-5.

At 6 months follow up patient is doing well and repeat scrotal USG shows normal testicular growth with normal vascularity.

Case 4:

A 9 years old male child with left side UDT presented to our OPD. After thorough clinical and radiological evaluation the left sided testis identified located intraperitoneally deep to the DIR. Germ cell tumour markers such as alphafetoprotein (AFP), carcinoembryonic antigen (CEA), lactate dehydrogenase (LDH) were within normal range. Patient started on injection beta-hCG 1000 U intramuscular, twice a week for 5 weeks (total 10 doses) prior to surgery.

Patient underwent open left orchidopexy and herniotomy under GA. Post-op was uneventful and the patient discharged on POD-5. At 6 months follow up patient is doing well and repeat scrotal USG shows normal testicular growth with normal vascularity.

Case 5:

A 6 years old male child presented with chief complaint of right sided non-palpable testis. Left side testis was normal and palpable. After thorough clinical and radiological evaluation the right testis was found to be located intraperitoneally just deep to the DIR. Germ cell tumour markers such as alphafetoprotein (AFP), carcinoembryonic antigen (CEA), lactate dehydrogenase (LDH) were within normal range. Patient was started on injection beta-hCG 500 U, intramuscularly, twice a week for 5 weeks (total 10 doses) completed before the surgery. After 5 weeks the patient underwent open right orchidopexy and herniotomy under GA with no post-op complications and was discharged on POD-5.

At 6 months follow up patient is doing well and repeat scrotal USG shows normal testicular growth with normal vascularity.

DISCUSSION:

Orchiopexy is the standard recommended treatment for UDT. While open orchiopexy being reserved for palpable UDT, Laparoscopic orchiopexy is the current standard surgical procedure for the non-palpable intraperitoneal UDT as well as the palpable UDT. It has several advantages such as diagnostic for impalpable UDT, relatively easier peritoneal dissection, high magnification, cosmetically better scar, less post-operative pain. [7,8]

Despite these advantages it has several disadvantages such as long

learning curve, complex technical skills, unavailability of instruments, expensive. [8] All of which become more significant while working in a peripheral rural setting.

There are several studies which shows equivalent effectiveness of both laparoscopic and open orchiopexy procedure. [8,9] In a study by Yang et al. success rate of open orchiopexy was 98.5% as compared to laparoscopic procedure (100%) owing to redo orchiopexy for the post-operative testicular ascent.[7] No post-operative testicular ascent was seen in our cases and thus redo orchiopexy was not required in any of them at 6 months follow up.

Although the location of intra-abdominal testes can be variable, along the pathway of descent from the retroperitoneum to the scrotum. It is usually located just inside the internal ring.[10]

Braga et al. in their study reported the borderline improvement in intra-operative testicular positioning and decreases the tension on spermatic cord in patients treated with preoperative beta-hCG injections. Similar finding of cord lengthening was evident intra-operatively in our cases as well as in two of the cases, previously unpalpable testis become palpable at the DIR before the surgery.[4] Adequate data is scanty and high degree of heterogeneity in existing studies make the comparison of effectiveness of hCG and other gonadotropin releasing hormones formidable.[3]

Beta-hCG has some side effects such as virilization, increase in penis size, painful erectile episodes, aggressiveness. But these side effects were found to be receded by the 6 month of follow-up.[10] In our cases slight penile erections were evident with no virilization in any of the cases. Pre-operative beta-hCG injection found to increase the rate of complete testicular descent especially in low lying testis in inguinal canal. It also lead to higher testosterone response when given between 6-35 months of age.[3,11,12] We get the similar result in our two cases who were less than 16 months age. Studies also shown that neoadjuvant GnRH treatment improves fertility index in prepubertal cryptorchidism.[13]

Pre and post-operative ultrasound comparison reveals no significant difference in the testicular volume at 6 months follow up. This is contrary to the findings of a study which showed increase in the testicular volume after the surgery.[7]

Laparoscopic orchiopexy is associated with increased risk of testicular ascent or atrophy, and indirect inguinal hernia with overall risk of less than 1%. [9] However, no such complications were seen in our cases. Previous studies reported that final post-operative testicular scrotal position was more adequate in patients undergone laparoscopic orchiopexy compared to open procedure, especially in patients older than 3 years of age.[7] Whereas in our experience, in all the three cases (4 years, 9 years and 6 years) of age, post operative testicular position was adequate and no testicular descent was seen at the follow up of 6 months.

Previous studies had also reported that open orchiopexy is cost effective and requires less operating time as compared to the laparoscopic procedure.[7]

There are several limitations to this case series such as fewer sample size, short follow-up duration of 6 months, no comparison group and randomisation. Long term follow-up study is essential to further support the findings.

CONCLUSION:

This case series of 5 cases highlights the importance of use of beta-hCG intramuscular injection as an adjunct to the open orchiopexy in the selected patients of non-palpable, undescended testis (UDT), all of which confirmed radiologically to be located intraperitoneally deep to and or around the DIR.

Age adjusted dosage of intramuscular beta-hCG injection given twice a week for upto 5 weeks prior to the definitive surgery. It was found to be highly effective in preserving the size and vascularity of the UDT. Spermatic cord lengthening was seen in all cases but the testicular size and volume remains the same. Thus, allowing for the open surgical mobilization through the inguinal canal and orchidopexy with minimal post-op complications as compared to the standard laparoscopic orchiopexy. In all our cases, testes had adequate size, vascularity and

intrascrotal position as confirmed by ultrasound in the follow-up at 3 weeks, 6 weeks and 6 months. Although, open orchiopexy is currently preferred in palpable UDT, it can still be an effective and safe procedure when pre-operative beta-hCG injection is used as an adjunct to it in selected patients having non-palpable UDT around the DIR. It can be a great alternative to the laparoscopic procedure especially in the peripheral rural areas where sophisticated advanced laparoscopic devices and laparoscopic training are unavailable and where most patients present at >1 years of age due to unavailability of the resources, unawareness of the disease and its consequences. Further, additional research and clinical trials with large sample sizes needed to validate these findings and its association.

Case Summary Table:

S. No.	Age	Diagnosis	Beta-hCG dose	Additional procedure	Post-op complications	Any congenital anomaly	Testicular size, vascularity and scrotal position on USG at follow-up
1.	10 months /	Left UDT with left congenital inguinal hernia	250 U biweekly	NO	NO	NO	Adequate
2.	1.5 Years	Bilateral UDT	250 U biweekly	NO	NO	NO	Adequate
3.	4 Years	Right UDT	500 U Biweekly	NO	NO	NO	Adequate
4.	9 Years	Left UDT	1000 U Biweekly	NO	NO	NO	Adequate
5.	6 Years	Right UDT	500 U biweekly	NO	NO	NO	Adequate

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