



Evaluation Of Jones Technique & Modified Jones Technique In The Treatment Of High Undescended Testis At A Tertiary Hospital

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Abstract

Introduction: Cryptorchidism or Undescended testis is the absence of one or both testis from the scrotum. The primary management of cryptorchidism is surgery, conventionally called orchiopexy. complications *Jones and Bagely* suggested a high inguinal incision as the open surgical alternative for high canalicular or intraabdominal testis known as Jones technique^[14] while as modified Jones procedure is the combination of Jones technique with post operative hormonal therapy (HCG).

Aims And Objectives: To study the efficacy of Jones technique in the management of high impalpable testis. To study the comparison between the Jones Technique and Modified Jones technique in the management of high impalpable testis.

Results: The maximum number of patients of undescended testis present in the age group of 3 – 6 years. Undescended testis were found more common in patients with birth order first. Right-sided undescended testis were more common than left-sided undescended testis and is perhaps related to later descent of right testis. Unilateral undescended testis were more common than bilateral undescended testis in ratio of 7.3 : 1. By using Jones technique, 88% of intra-abdominal testis were brought into scrotum successfully. Post-operative hormonal therapy (HCG) improves the outcome of Jones technique. There is 24 % improvement in success rate in Modified Jones technique. The incision used in Jones technique of orchidopexy gives a good access, is comfortable post operatively and heals well. The exposure obtained by Jones technique allows extensive mobilization of the testicular vessels and vas deferens in the retroperitoneum. A wide search can be made for an abdominal testicle, and this allows a confident diagnosis of anorchia to be made if the search for the testicle proves negative. By using Jones technique, it is easier to dissect out the hernial sac and separate it from the vessels above the inguinal ligament. So there is no need to retract and enlarge the deep inguinal ring or to incise the posterior wall of the inguinal canal as is hitherto recommended in some difficult situations.

Conclusion; Jones technique should become as an established procedure for impalpable / intra-abdominal testis and a viable alternative to other known surgical procedures

Keywords:

Introduction

Cryptorchidism or Undescended testis is the absence of one or both testis from the scrotum. This usually represents failure of the testis to move, or "descend," during fetal development from an abdominal position, through the inguinal canal, into the

ipsilateral scrotum. About 3% of full-term and 30% of premature infant boys are born with at least one undescended testis, making cryptorchidism the most common birth defect of male genitalia^[1,2]. However, about 80% of cryptorchid testis descend by the first year of life (the majority within three months),

making the true incidence of cryptorchidism around 1% overall. About two thirds of cases without other abnormalities are unilateral; 1/3 involve both testis^{3,4}. In 90% of cases an undescended testis can be palpated (felt) in the inguinal canal; in a minority the testis are in the abdomen or nonexistent (truly "hidden"). It is now established that cryptorchid testis show an increased predisposition to malignant degeneration. In addition, fertility is decreased when the testicle is not in the scrotum. For these reasons, surgical placement of the testicle in the scrotum (orchidopexy) is indicated. The primary management of cryptorchidism is surgery, conventionally called orchiopexy⁵. It is usually performed in infancy, if inguinal testis have not descended after 4–6 months, often by a pediatric surgeon, but in many communities still by a general surgeon. In cases where the testis are identified preoperatively in the inguinal canal, Standard Orchiopexy is often performed early in life with a very low complication rate. Surgery becomes more complicated if the blood supply is not ample and elastic enough to be stretched into the scrotum. In these cases, the supply may be divided, some vessels sacrificed with expectation of adequate collateral circulation (Fowler- Stephens Orchiopexy). In the worst case, the testis must be "auto-transplanted" into the scrotum, with all connecting blood vessels cut and reconnected ("anastomosed") using Microvascular Autotransplantation. The principal major complication of these types of orchiopexy is loss of the blood supply to the testis, resulting in loss of the testis due to ischemic atrophy or fibrosis. To avoid these complications Jones and Bagely suggested a high inguinal incision as the open surgical alternative for high canalicular or intraabdominal testis known as Jones technique^[14] while as modified Jones procedure is the combination of Jones technique with post operative hormonal therapy (HCG)⁷.

Aims And Objectives: To study the efficacy of Jones technique in the management of high impalpable testis. To study the comparison between the Jones Technique and Modified Jones technique in the management of high impalpable testis.

The study entitled Evaluation Of Jones Technique & Modified Jones Technique In The Treatment Of High Undescended Testis was conducted in the Department Of Pediatric Surgery, Sher-I-Kashmir

Institute Of Medical Sciences, Srinagar. All the patients undergoing Jones & Modified Jones technique for undescended testis were included in this prospective study. In our study we included the affected children upto 6 years of age. Children with retractile testis or clinically palpable undescended testis were excluded from this study. All the patients were subjected to thorough clinical examination with special emphasis on urogenital system. Ultrasonography was used for localisation of impalpable testis. Once diagnosis of high impalpable testis was confirmed, the patients were then grouped randomly into two categories. In one group, patients were subjected to Jones technique of orchidopexy & the other group was subjected to Modified Jones technique of orchidopexy.

Method: All the patients were managed as per the following protocol.

History

Detailed history with special emphasis on,

1. Name age and residence
2. Whether the testis were absent since birth or present then disappeared
3. History of undescended testis in the family
4. History of any hormone intake by the mother during pregnancy
5. History of any other relevant disorder in family.

Examination:

1. General physical examination
2. Systemic examination of all the systems
3. Local examination:
 - a. Side of disorder
 - b. State of development of scrotum. The diagnosis of impalpable testis was made, when testis were not palpable along the normal course or at an ectopic site and ipsilateral scrotum was poorly developed.
 - c. Any associated urogenital anomaly

Investigations

Every patient was subjected to the following investigations:

1. Complete hemogram , cougulogram , LFT , KFT
2. Routine urine examination
3. Ultrasonography for localisation of impalpable testis

Once diagnosis of high impalpable testis was made, one group of patients were then subjected to Jones technique of orchidopexy and the other group was subjected to Modified Jones technique of orchidopexy.

Jones Technique Of Orchidopexy: Principles of this procedure include preservation of spermatic vessels ,high retroperitoneal mobilisation of spermatic vessel and passage of the testis directly through the abdominal wall at the pubic tubercle. A transverse incision is made medial to the anterior superior iliac supine and carried down to the external oblique fascia just superior to the internal ring.once fascia is incised ,a muscle spilitting technique is performed to expose the retroperitoneum and mobilise the peritoneum medially .The internal ring and processus vaginalis ,if present ,are identified and the peritoneum opened at this level to deliver the testis into the field .After ligating the hernial sac ,the spermatic vessels are dissected from the lateral spermatic fascia as for cranial as possible and a prentiss maneuver is performed by passing the testis under the floor of the inguinal canal to an exit site

just above the pubic tubercle .If there will be any tension on the testis after delivery of the testis into the subdortos pouch ,an external nylon fixation button helps maintain a dependant scrotal position.
Modified Jones Technique: This is the combination of Jones technique with post operative hormonal therapy (HCG) in the dose of 1000-2000IU intramuscular, weekly is started in the immediate post-operative period for a period of three weeks depending on age and weight of the patient.

Results

The study entitled “Evaulvation of Jones technique and Modified Jones technique in the treatment of high undescended testis” was conducted in the department of pediatric surgery from August 2010 upto June 2012. A total of 50 patients were included in the study,who were admitted as UDT with testis lying in abdomen based on local examination and documented on ultrasonography .After thorough history taking from the patient’s parents, clinical examination and investigations were carried on.Patients were randomly divided into two study groups .Jones orchidopexy was done in one group and Modified Jones orchidopexy was done in another group. Our surgical technique was the same as described by Jones et al in 1978^[8].The observations made during the study are as under.

Table-1: Age of presentation

	PROCEDURE PERFORMED	N	Mean age in years	Std. Deviation	Std. Error Mean
AGE	JONES	25	4.320	1.5199	.3040
	MODIFIED JONES	25	4.860	1.6741	.3348

In our study,out of 50 cases,we found maximum number of patients in the age group of 3-6 years.The mean age of our patients was 4.3 years in Jones orchidopexy group and 4.8years in Modified Jones orchidopexy group. However referring to the p value (0.238), there is no stastically significant difference between the two groups with respect to mean age of presentation.

Table-2: Number of unilateral / bilateral cases of undescended testis

Type	Number (n=50 cases)
Unilateral right	28 (56%)
Unilateral left	16 (32%)
Bilateral	06 (12%)

In our study out of 50 cases of undescended testis , 28 patients were having right undescended testis , 16 patients had left undescended testis and the remaining 6 patients had bilateral undescended testis.

Table – 3 : Testicular volume / size in pre-operative and post-operative period in JONES ORCHIDOPEXY GROUP

TESTICULAR VOLUME	N	MEAN TESTICULAR VOLUME (cm ³)	Std . DEVIATION	Std. ERROR MEAN
AT SURGERY	25	0.4960 cm ³	0.23270	0.04654
AT 6 MONTHS POST-OPERATIVE	25	1.0020 cm ³	0.61296	0.12259

Table – 4B : Testicular volume / size in pre-operative and post-operative period in Modified Jones Orchidopexy Group

TESTICULAR VOLUME	N	MEAN TESTICULAR VOLUME (cm ³)	Std . DEVIATION	Std. ERROR MEAN
AT SURGERY	25	0.6620 cm ³	0.18500	0.03700
AT 6 MONTHS POST-OPERATIVE	25	1.0580 cm ³	0.44830	0.08966

Testicular volume / size in pre-operative and post-operative period (table 4) :

Testicular volume/size of the testis to be operated was assessed in pre-operative period by using ultrasonography and in post-operative period at 6 months, it was assessed by using orchidometer and ultrasonography. Following observations were made:-

The mean testicular volume in pre-operative period was 0.49 cm³ in Jones orchidopexy group and 0.66 cm³ in Modified Jones orchidopexy group and at 6 months post-operative period it was 1.00 cm³ and 1.05 cm³ respectively. So the testicular volume in post-operative period has increased in both groups significantly.

Table -5: Immediate testicular localization after surgery

			IMMEDIATE POST-OPERATIVE		Total
			LOCALISATION OF TESTIS		
			Scrotum	Sup inguinal ring	
PROCEDURE PERFORMED	JONES	Count	22	3	25
		% within PROCEDURE PERFORMED	88.00%	12.00%	100.00%
	MODIFIED JONES	Count	22	3	25
		% within PROCEDURE PERFORMED	88.00%	12.00%	100.00%
Total		Count	44	6	50
		% within PROCEDURE PERFORMED	88.00%	12%	100.00%

Immediate testicular localization after surgery (Table 5)

During the surgical procedure, in most of the patients we were able to bring the testis into the scrotum. However it was not possible to bring them to scrotal position in some cases even after achieving maximal cord mobilization. Of the 50 patients we were able to achieve the scrotal position of the testis in 44 patients. However in remaining 6 patients, testis were positioned near the superficial inguinal ring and fixed with pubic tubercle as a staged procedure. In second stage after 6 months, 3 testis were further mobilized and placed successfully into the scrotum. The other 3 testis were atrophied and were excised.

Table-6: Procedure Performed * Testis Localisation At 6 Months Post –Operative Period

		TESTIS LOCALISATION AT 6MONTHS POST- OPERATIVE				Total
		Scrotum	Impalable	Superficial ing ring		
PROCEDURE PERFORMED	JONES	Count	22	3	0	25
		% within PROCEDURE PERFORMED	88.00%	12.00%	0%	100.00%
	MODIFIED JONES	Count	22	1	2	25
		% within PROCEDURE PERFORMED	88.00%	4.00%	8.00%	100.00%
Total		Count	44	4	2	50
		% within PROCEDURE PERFORMED	88.00%	8.00%	4.00%	100.00%

Testis localisation at 6 months post –operative period (Table 6)

Testicular location irrespective of the size ,after 6 months of surgery was assessed by clinical examination.Out of total no of 50 cases 44 testis were palpated in scrotum and in remaining 6 patients, 2 testis were located /palpated at superficial inguinal ring and another 4 testis were found impalpable. However in Jones orchidopexy ,out of 25 testicles being operated ,22 testis were palpated in scrotum and remaining three were found impalpable. In Modified Jones orchidopexy group ,out of 25 testis being operated upon,22 testis were palpated in scrotum and in remaining 3 cases,2 testis were found at superficial inguinal ring and one testis was impalpable.

Table-7: Post-operative complications

		COMPLICATION		Total	
		NO	YES		
PROCEDURE PERFORMED	JONES	Count	13	12	25
		% within PROCEDURE PERFORMED	52.00%	48.00%	100.00%

	MODIFIED JONES	Count	20	5	25
		% within PROCEDURE PERFORMED	80.00%	20.00%	100.00%
Total		Count	33	17	50
		% within PROCEDURE PERFORMED	66.00%	34.00%	100.00%

Post-operative complication (table 7)

Of the total number of 50 patients,17 of our patients developed complications.Of these 12 patients developed testicular atrophy,3 patients developed testicular haematoma , and 2 patients developed wound infection at incision site.In Jones orchidopexy group,9 patients developed testicular atrophy,2 patients developed testicular haematoma,and 1 patient developed wound infection at incision site.

In Modified Jones orchidopexy group,we encountered complication in 5 patients,3 patients developed testicular atrophy and 2 patients developed testicular haematoma as a complication.

Table-8: Procedure Performed * Result

			RESULT		Total
			Success	Failure	
PROCEDURE PERFORMED	JONES	Count	16	9	25
		% within PROCEDURE PERFORMED	64.00%	36.00%	100.00%
	MODIFIED JONES	Count	22	3	25
		% within PROCEDURE PERFORMED	88.00%	12.00%	100.00%
Total		Count	38	12	50
		% within PROCEDURE PERFORMED	76.00%	24.00%	100.00%

Results of the procedure performed (table 8)

The result of the two procedures was compared in terms of post-operative localization and size / volume of the testis at 6 months. A procedure was labeled as successful when the testis were lying in good scrotal position with enhancement of volume / size as compared to pre-operative period and it was labeled as failure when the testis were either not found in scrotum or there was evidence of atrophy. Out of the total no of 50 patients (both groups) our success rate was 76.0% and the failure rate was 24.0%. In respective groups the success rate was more in Modified Jones orchidopexy with success rate as 88% and failure rate of 12%. In Jones orchidopexy the success rate was 64% and failure rate as 36%. However referring to the p value (0.047) there is stastically significant difference between the two groups with respect to the results of the two procedures. So the results were better in case of Modified Jones orchidopexy **DISCUSSION;** The study entitled “Evaluation of Jones technique and Modified Jones technique in the treatment of high undescended testis” was conducted in the department of pediatric surgery SKIMS Soura from August 2010 upto June 2012. The study group comprised of children between 1-6 years who attended pediatric surgery out-patient department. After proper history taking and clinical examination , patients were subjected to the required investigations as per our protocol .Our study group comprised of children having undescended testis with testis lying in abdomen as documented on high resolution ultrasonography. The study group was randomly divided into two equal groups.

The main objective in the management of undescended testis is to achieve a good scrotal position for the testis sufficiently early to allow them to reach their maximal potential .Hormonal therapy

and surgery are two important choices .In our study we incorporated both the choices .In one group of patients only surgery was performed(Jones orchidopexy)and in next group both surgical and hormonal therapy was instituted(Modified Jones orchidopexy).The surgical technique used by us was the same as was adopted by Peter F Jones and Frederick H Bagely^[8].The results of the study were compared with the available literature as under:-

Age of Presentation:-

In our study the age of presentation ranged between 1-6 years. The maximum number of patients in our study were in age group of 3-6 years. The mean age of our patients was 4.3 years in Jones orchidopexy group and 4.8 years in Modified Jones orchidopexy group . Synder M^[9] in 1993 in his study entitled ‘bilateral undescended testis ‘ revealed that the maximum number of patients with undescended testis were in age group of < 2 years i.e. 48.2% , followed by age group 2-6 years i.e. 39.1%. The delayed age of presentation noticed in our study is because of the paucity of public awareness, rural background, false hope of spontaneous descent and illiteracy in this part of the world.

Relationship between undescended testis and birth order:-

In our study the maximum number of patients with Undescended testis were of first birth order- 22 (44%) followed by second, third, and fourth – 13 (26%), 9 (18%) , and 4 (8%) respectively. The birth order in the studies by Swerdlow et al (1983)^[10] and M K Thong (1998)^[11] were 47.3 % and 41.6% for birth order 1 and 52.7 % and 58.4 % for birth order > 1, respectively. The findings in these studies correlate well with our study as depicted below:

Birth order	Swerdlow et al (1983)	M K Thong (1998)	Present study
1	47.3%	41.6%	44%
>1	52.7%	58.4%	56%

Laterality of undescended testis:

In our study out of 50 cases of undescended testis , 28 patients (56 %)were having right undescended testis , 16 patients (32%) had left undescended testis and the remaining 6 patients (12 %) had bilateral undescended testis which is consistent with the study by Synder M 1993^[9] as depicted below:

Laterality	Synder M (1993)	Present study		
		Right	Left	total
Unilateral	83.5%	56%	32%	88%
Bilateral	16.5%	12%		

Efficacy of Jones orchidopexy and Modified Jones orchidopexy :

In our study of 50 patients we were able to bring 44 testis into the scrotum and the remaining 6 testis had to be kept at superficial inguinal ring. Peter F Jones and Frederick H Bagely by using the same approach were able to bring 85 testicles into the scrotum out of 86 testicles being operated, but they included both intraabdominal and canicular testis in their study

.Of the 86 testicles they operated ,6 were abdominal, 42 were at deep inguinal ring or in the inguinal canal and 38 testis were ‘emergent’. Thus results obtained in our series are some what inferior to those observed in above mentioned series. However in our study we included only testis which were abdominal and this might be the reason for difference between their and our results. The results are depicted in the table as mentioned below:

Study	Percentage of testis brought into scrotum
Peter F Jones ⁷	98.83 %
Present study	88 %

The success rate of the Jones orchidopexy in our study was 64%. In Jones orchidopexy group, after 6 months of surgery, out of the 25 testicles being operated ,16 testicles were found in good scrotal position and with increasing size / volume as compared to pre-operative status. The remaining 9 testis were found atrophied. However we had the better results in the Modified Jones orchidopexy

group in which we included post operative hormonal therapy by using HCG. The success rate in this group was found to be 88% which is consistent with the study by Intezar ahmad and et al^[11] in which the success rate in Modified Jones orchidopexy was 80%. Results of both the studies are depicted in the table below:

Study	Success rate
Intezar et al ^[11]	80%
Present study	88%

So our results were encouraging and the procedure should further be studied at other institutions before it is recommended as an established procedure for non-palpable / intra-abdominal undescended testis.

Conclusion

We recommend the early diagnosis and treatment of undescended testis, so as to improve the fertility and

early detection of testicular malignancy. By six months of age ,a pediatric surgeon or a healthcare person looking the child should evaluate patients with

undescended testis and make up a clear plan of management. Observation should not be recommended beyond 1 year of age as it delays treatment, leads to irreversible histopathological changes in testicular tissues, impairs spermatogenesis and decreases the rate of surgical success. Treatment for undescended testis should begin at 6 months of age and may consist of hormonal, surgical treatment or both as per standard indications. We recommend the Jones technique for impalpable / intra-abdominal testis as a suitable option, because the success rate of bringing the testicle from abdominal position into scrotum is 88 %. Post-operative HCG should be given after Jones orchidopexy as it improves the overall result of the procedure particularly in situation where tension free placement of testis in scrotum is difficult. We recommend that Jones technique should become as an established procedure for impalpable / intra-abdominal testis and a viable alternative to other known surgical procedures .

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