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A FIVE YEAR PROSPECTIVE STUDY OF 206 CASES OF CRYPTORCHID TESTES AT A TERTIARY CARE HOSPITAL IN NORTH KASHMIR WITH PARTICULAR REFERENCE TO THE ASSOCIATION OF THE LOCATION OF UNDESCENDED TESTIS AND ASSOCIATED GROSS MORPHOLOGICAL VARIATIONS AND MICROSCOPIC CHANGES.

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ABSTRACT **Background :** The undescended testis is a common congenital anomaly, occurring in about 1 to 2 per cent of the male population at birth, and in 0.8 per cent of boys at one year of age. Cryptorchid testes are frequently associated with gross morphological changes with regard to size and shape of the tests, various degrees of detachment between the epididymis and testis as well as histological changes. **Objective** :To study the incidence and types of cryptorchid testes in different age groups and correlation between location of undescended testes and associated gross and microscopic changes in different patients. **Methods :** 206 male children were operated in the department of General Surgery at our institute from January 2013 to December 2017. Cases were analysed according to the age, type and location of cryptorchid testes, any testicular atrophy, epididymal and vassal anomalies and histological changes. The results were analysed and conclusions drawn.**Results :** There was not a significant difference between the incidence of undescended testes on two sides. 74.75 % patients were older than 4 years and the mean age at presentation was 6.7 years. The frequency of abdominal undescended testes increased with increase in age while that of suprasrcotal testes decreased with increase in age. Most testes in suprascrotal position were normal or had mild atrophy (80%) while intracanlicular, internal ring and abdominal testes showed moderate to severe atrophy (79.56%). Testes at abdominal positions showed moderate or profound epididymal (49.46%) and vassal (32.25%) anomalies. Orchidectomy or testicular biopsy specimens showed an incidence of Seminomas has 3.76% in intra abdominal testes while high scrotal, inguinal canal and internal ring testes showed an incidence of 0.00%, 1.61% and 2.15% respectively.**Conclusion :** It was concluded that even though the necessity for early surgical correction is well established, these patients at least in our region, still tend to present very ;late for undergoing surgery, with consequent increased risks of infertility and malignant transformation.

KEYWORDS : Crytorchildism, testis, epididymis, vas deferens, histological changes, germ cell tumours, Seminomas

INTRODUCTION

Cryptorchildism constitutes the most common genital problem in male children[1]. Its incidence is approximately 3% in term infants, but drops to 0.7% to 0.8% in the first year of life due to spontaneous testicular descent[2-6]. Little spontaneous descent occcurs thereafter[6]. Studies of school children demonstrated a 0.7% to 1% prevalence of cryptorchidism[7]. This slight increase in incidence is attributed to cases with an occult hernia, retractile testes, or delayed sponataneous secondary testicular ascent, perhaps due to reabsorption of the processus vaginalis[8]. Under normal conditions, the testes descend progressively only after the seventh foetal month[9-10]. Recently, it has been suggested that testicular descent occurs in two stages with different anatomic and hormonal mechanisms for each stage[11-13]. Cryptorchid testes are frequently associated with gross morphological changes with regard to the size and shape of the testis, various degrees of detachment between the epididymis and testis, and elongation of the caudal epididymis and vas deferens[14-16], as well as histological changes , especially diminished germ cell counts[17-18]. This study examined the gross and microscopic testicular changes including malignant transformation and also the alterations of the epididymis and vas deferens in relation to various parameters.

MATERIALAND METHODS

This study included 206 male infants and boys operated upon in the department of General Surgery at Govt. Medical college Baramulla, Kashmir from January 2013 to December 2017. Cases were analysed according to the following parameters; (i) age; (ii) type and location of crptorchidism; (iii) presence of epididymal and vassal anomalies; (iv) presence of testicular appendages (v) gross estimation of testicular atrophy; and (vi) histological changes. Statistical analysis was performed by Chi Square test.

RESULTS

In the present study, there appeared to be no relation between the incidence of the cryptorchid side to the sides involved; right side was involved in nearly one half of the cases, while in 18.46% of the cases the cryptorchidism was bilateral. In addition, it was observed that most of the patients (74.75%) were older than 4 years, and many were older than 8 years (26.21%). The mean age at presentation was 6.7 years (Table-1).

In our study, twenty (9.70%) patients had suprascrotal testes while 186(90.30%) patients had truly undescended testes. The frequency of abdominal undescended testes increased with increasing age ($p<0.1$) while that of suprascrotal testes decreased with increasing age ($p<0.001$) (Table-2).

The relation of gross testicular atrophy to the location of testis is shown in Table3. Most undescended testes in a suprarscrotal postion were either normal or had mild atrophy (80.00%) while testes in intracanalicular, internal right, and abdominal positions frequently showed moderate or severe atrophy (79.56%). This results were statistically significant ($p<0.0001$).

Epididymal and vassal anomalies and the presence of testicular appendages in relation to testicular location is shown in Table 4. Most suprascrotal testes were either normal or had mild extension and looping of epididymis (90.00%) while most of the testes in intracanalicular, internal ring, and abdominal positons showed moderate or profound epididymal anomalies (49.46%). ($p<0.0001$). Vassal anomalies were very rare in suprascrotal testes (10.00%) but very common in higher cryptorchid testes (32.25%) (Table-4).

Table 5 shows the histologic findings of the 186 cases that had either excision of the atrophic testes or a testicular biopsy taken intra operatively. The majority of the testicular biopsies from children older than 4 years revealed markedly diminished germ cell counts (4.85% to 11.65%) and few normal counts (2.92% to 19.42%). Histological findings also correlated with testes location (Table 6).

Markedly diminished germ cell counts were found in 38.70% of cases of higher cryptorchidism and 5.00% of suprascrotal testes. In contrast, normal germ cell counts were found in 80.00% of suprascrotal testes but only 29.03% of cases of abdominal and intracanalicular testes.

The incidence of germ cell tumours on microscopic examination of

186 samples of orchidectomy/testicular biopsy specimens showed an incidence of 3.76% of seminomas in histological specimens of intra-abdominal testes while the samples taken from high scrotal, inguinal canal and internal ring testes revealed an incidence of 0.00%, 1.61% and 2.15% respectively (Table 7).

DISCUSSION

The first major finding from our results was that children with cryptorchidism presented very late to the general and paediatric surgery departments in our region; nearly 74.75% were older than 4 years. It appears that although for the last two decades it has been stressed that cryptorchidism should be treated in early childhood, this concept has not had much impact on pediatricians' consultations. In addition, social and ethical prejudices of the parents still play an important role in the delayed referral of these patients to the surgeon. The age distribution for the various sites of cryptorchid testes shows that with increasing age the incidence of intra abdominal testes increases , while the frequency or supra-scrotal testes decreases. This is due to the fact that low cryptorchid testes are felt early by parents of affected children while boys with impalpable, intra-abdominal testes and it takes a long time before they are diagnosed and seek medical assistance.

Intracanalicular and intra-abdominal testes more frequently showed moderate to severe gross atrophy than testes in a suprascrotal position. The gross alterations of testicular volume and shape were accompanied by analogous microscopic findings: diminished germ-cell counts, hypoplasia, or atrophy. Even though the number of testes that were histologically examined was limited, it is clear that pathological changes parallel with the gross findings. They were markedly diminished germ-cell counts in high cryptorchid testes than in suprascrotal testes. In addition, older children more often showed significantly diminished germ-cell counts than younger children and infants. These findings are in accordance with previous observations that the location of cryptorchid testes and patient age at the time of orchiopexy are the major determinants of subsequent fertility in these individuals (Lala R et al 1992) [19]. Elongation and looping of the epididymis were common findings in all sites of cryptorchidism. However, these changes are more prominent in high cyptorchid testes than suprascrotal testes. The same was true for vassal anomalies. It is well known that gross alterations of the epididymis and vas frequently accompany cryptorchid testes (Miliaras D et al 1995 and Rajfear J et al 1997)[20,21]. Considering this fact, many authors have suggested a causal relationship between these anomalies and cryptorchidism. Recently, some studies have investigated the presence of epididymal anomalies in patients operated upon for reasons other than cryptorchidism, and found that these changes were also common in this group of patients[22]. If these anomalies are common in the general population, a casual relationship with cryptorchidism could be disputed. Nevertheless, according to our data as well as the literature[23-25], epididymal and vassal alterations are more pronounced in cryptorchidism, especially in high-lying testes, than in non-cryptorchid tests. These findings support the view that, at least in some cases, both mechanical (anatomic) and hormonal factors are responsible for the pathogenesis of cryptorchidism.

The incidence of testicular germ cell tumours (seminomas) observed in our study in suprascrotal, intracanalicular and internal ring positions was very low (0.00%, 1.61% and 2.15% respectively; p<.001) while in case of intra abdominal testes it showed a significantly higher incidence of 3.76% (p<.0001). The higher incidence of testicular germ cell tumours in cryptorchid testes, notably seminomas, are due to the transformation of primordial germ cells (PGCs) into pluripotent germ cells which develop into precursor cancer cells. At abnormal location, especially an intra abdominal one, the primordial germ cells also known as gonocytes continue to proliferate or undergo improper differentiation, resillting in higher incidence of testicular germ cell tumours at these locations. [26-33]

CONCLUSION

Considering all these facts, it is thus concluded that cryptorchid testes are associated with gross morphological derangements as well as histological changes especially diminished germ cell counts and malignant transformation at locations higher up and even though the necessity of early surgical correction is well established , still patients especially in the northern region of Kashmir valley tend to present very late with consequent increased risks of infertility and malignant transformation.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained an appropriate patient consent from guardian/father of patients wherein they have consented that patient information can be reported in a journal without disclosing their identity.

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Ethical issues : -None-

Table 1. Cryptorchidism type in relation to age.

Age (Yrs)	Right sided n(%)	Left sided n(%)	Bilateral n(%)
0-2	12 (5.82)	6 (2.92)	4 (1.94)
2-4	4 (1.94)	14 (6.79)	12 (5.82)
4-8	46 (22.33)	38 (18.47)	16 (7.77)
8-14	24 (11.65)	24 (11.65)	6 (2.92)
Total	86 (41.74)	82 (39.80)	38 (18.46)

Table 2 : Cryptorchidism location in relation to age

Age (Yrs)	Truly undescended			
	Abdominal n(%)	Internal ring n(%)	Intra canalicular n(%)	Suprascrotal n(%)
0-2	-	8 (3.88)	6 (2.91)	8 (3.88)
2-4	-	13 (6.31)	16 (7.77)	1 (0.48)
4-8	16 (7.77)	37 (17.96)	38 (18.46)	9 (4.36)
8-14	16 (7.77)	20 (9.70)	16 (7.77)	2 (0.97)
Total	32 (15.54)	78 (37.86)	76 (36.89)	20 (9.71)

Table 3 : Gross estimation of testicular atrophy in relation to testes location

Testis location	Total no. of cases	Mild (%)	Atrophy Moderate n(%)	Severe n(%)
Intrabdominal	32(15.53)	4 (1.94)	6 (2.91)	22 (10.67)
Internal ring	78 (37.86)	18 (8.74)	36 (17.47)	24 (11.65)
Intracanalicula	76 (36.89)	16 (7.77)	32 (15.53)	28 (13.59)
Suprascrotal	20 (9.70)	16 (7.77)	4 (1.94)	-
Total	206 (100.00)	54(26.21)	78(37.86)	74(35.93)

Table 4 : Epididymal and vassal anomalies

Testes Location	Total no. cases	Extended looped epididymis n(%)	Vas extension n(%)	Testicular appendages n(%)
Intraabdominal	32 (15.53)	22 (10.68)	12 (5.82)	20 (9.71)
Internal ring	78 (37.86))	38 (18.47)	30 (14.56)	20 (9.71)
Intracanalicular	76(36.89)	32 (15.53)	18(8.74)	32 (15.53)
Suprascrotal	20 (9.70)	4 (1.94)	2 (0.97)	2 (0.97)
Total	206 (100.00)	96(46.60)	62 (30.09)	74 (35.92)

Table 5 : Histologic findings of 186 cases of truly undescended testes.

Age (Yrs)	Orchidectomy specimens		Germ cell counts in biopsy specimens		
	Atrophic n(%)	No parenchyma n(%)	Markedly decreased n(%)	Slightly decreased n(%)	Normal n(%)
0-2	0(0.00)	0(0.00)	5(2.43)	13 (6.31)	4 (1.94)
2-4	0(0.00)	0(0.00)	2(0.97)	8(3.88)	20(9.70)
4-8	12(5.82)	4 (1.94)	10(4.85)	34 (16.50)	40(19.42)
8-14	6(2.91)	10(4.85)	24 (11.65)	8 (3.88)	6 (2.91)
Total	18 (8.75)	14 (6.79)	41 (19.90)	63(30.58)	70(33.98)

Table 6 : Histologic findings of the testicular biopsies in relation to testes location.

Testis location	Markedly decreased Germ cell counts n(%)	Slighlty Decreased Germ cell counts n(%)	Normal Germ cell n(%)
High (abdominal canalicular)	72 (34.95)	60(29.13)	54(26.21)

Low (suprascrotal)	1 (0.48)	3 (1.46)	16 (7.77)
Total	73 (35.44)	63 (30.58)	70 (33.98)

Table 7 : Incidence of Germ cell tumours (Seminomas) on histological examination of biopsy specimens in relation to testes location.

Testes Location	Incidence of Germ cell tumours	
	Seminomas n(%)	Others n(%)
Intra abdominal	7 (3.76)	0(0.00)
Internal ring	4 (2.15)	0(0.00)
Intracanalicular	3 (1.61)	0(0.00)
Suprascrotal	0 (0.00)	0(0.00)
Total	14 (7.52)	0(0.00)

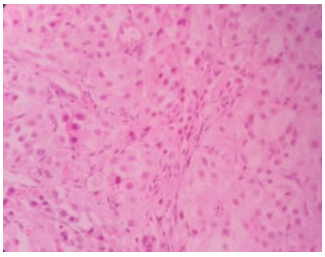

Fig 1 : Seminoma (40X) in a case of high inguinal testis.

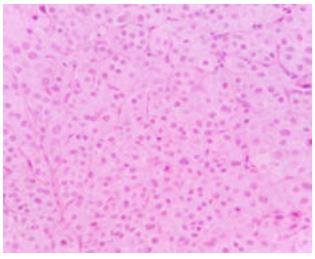

Fig 2 : Seminoma (40X) in a case of intra-abdominal testis.

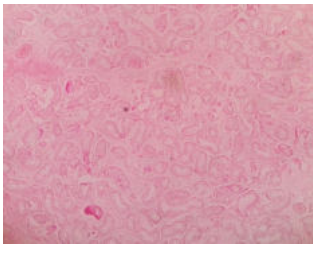

Fig 3 : Normal histological picture (4X) in a case of suprascrotal testis.

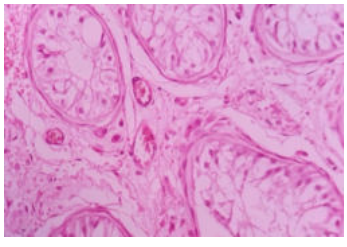

Fig 4: Intra- abdominal (40X) atrophic testis.

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