



A Clinical Study of Correlation between Spermatogenesis and Hydrocele in Fertile Age Group Patients

Authors

R.K. Singh¹, K.B. Mishra^{2*}, Saurabh Singh³

¹Professor, Department of General Surgery, GSVM Medical College Kanpur

²Professor, Department of General Surgery, GSVM Medical College Kanpur

³Junior Resident, Department of General Surgery, GSVM Medical College Kanpur

*Corresponding Author

Krishna Bahadur Mishra

A – 11 Deewah Kumy, A WHO Complex D Block Shyam Nagar, Kanpur UP, India

Email: kbm.mishra@gmail.com

Abstract

Introduction: Hydrocele surrounds testes and by virtue of this, it is liable to cause some change in the external environment of testes. This can be in the form of increased pressure, increased temperature. This can ultimately result in the morphological alteration of testes, which in turn can affect spermatogenesis

Aims: To study the effect of Scrotum size, etiology of Hydrocele and volume of fluid of hydrocele on spermatogenesis.

Material and Methods: The study was conducted in the department of general surgery GSVM Medical College, and Associate LLRM Hospital from January 2017 to October 2018 on 120 patients who were admitted from casualty and outpatients department with a diagnosis of Bilateral hydrocele.

Result: It was found that Bilateral Hydrocele have a little effect over spermatogenesis, Majority of cases were of Severe Hydrocele. there was marked thickening of the tunica albugenia, There was oligozoospermia seen in 15% of case which improved postoperatively, some cases also showed defect in sperm morphology and sperm motility. None of these changes correlated with Pain and etiology hydrocele.

Conclusion: It is concluded that vaginal hydroceles significantly affect the morphology of the testis. there is a significant association of Size and duration of Hydrocele with Total Sperm Count, Sperm motility, Sperm Morphology. To sum up it would seem that big hydrocele of long duration impair spermatogenesis.

Introduction

Cystic swelling of scrotum are common surgical problem which affects the physical wellbeing of the patient, it is rather a mental agony for him. These swellings are easily accessible for clinical examination. The spectrum consists of hydrocele, epididymal cysts, spermatocele, pyocele, chylocele, parasitic cyst and sebaceous cysts.

Primary hydrocele is an abnormal collection of serous fluid in some part of processus vaginalis, usually the tunica vaginalis.⁽¹⁾ It is divided into simple(scrotal) and communicating.⁽²⁾ Epididymal cysts represent cystic degeneration of epididymis and are filled with crystal clear fluid.⁽²⁾

Cystic swellings of scrotum are invariably painless and can attain very large size without

causing much discomfort for the patient. Indication for treatment include pain, discomfort and cosmetic appearance scrotum or the patients wish.⁽⁴⁾

Conventional treatments for primary hydrocele, epididymal cysts and spermatocele include repeated aspiration, aspiration and injection of sclerosant or surgery.⁽⁵⁾ The gold standard continues to be surgical extirpation of the cyst.

Hydrocoele was first defined by Ambroise Pare. In India scrotal hydrocele is one of the commonest conditions resulting from both filarial and non-filarial etiology. The exact etiology of hydrocele of Tunica vaginalis is not known.

According to Wallace⁽¹⁴⁾, it is the result of lymphatic obstruction either due to low grade inflammation of epididymis or due to trauma to the scrotum. However, hydrocele in tropics has often been connected with filarial infection.' Hydrocele fluid closely surrounds testes and by virtue of this, it is liable to cause some change in the external environment of testes. This can be in the form of increased pressure, increased temperature. This can ultimately result in the morphological alteration of testes, which in turn can affect spermatogenesis and steroidogenesis.

Scrotal hydrocele can lead to alteration in the functional status of the testes upto such an extent that sterility or subfertility may result.^(2,3,5,6,10)

In the present work we have studied the effect of scrotal hydrocele in spermatogenesis and testicular function and have correlated the findings with the clinical picture of the patient

Aims and Objectives

1. To study the effect of Scrotum **size** and volume of fluid of hydrocele on spermatogenesis.
2. To study the effect of duration of hydrocele on testis and spermatogenesis.
3. To find out the etiology of Hydrocele and effect on spermatogenesis in relation to etiology

Material & Methods

The study was conducted in the department of general surgery GSVM Medical College, and Associate LLRM Hospital from January 2017 to October 2018 on patients who were admitted from casualty and outpatients department with a diagnosis of Bilateral hydrocele.

In the present study 120 cases of Bilateral scrotal hydrocele were studied. Unilateral cases were excluded from the study. The age of the patients ranged from 20 - 45 yrs with minimum 2 yrs duration.

Detailed clinical history of patients were ' taken with special emphasis on history of trauma, filariasis and mumps. History of pain, fever and family history was also noted.

During the surgery (which was performed under local anaesthesia) volume and colour of hydrocele fluid was noted and tunica vaginalis, epididymis and testes were examined for any gross changes.

Tunica vaginalis was examined with special reference to its thickness. Similarly testes were examined for any flattening alteration in size, shape, color of the surface etc. Similarly epididymal thickening if present was also noted.

Semen Analysis

Semen analysis was done preoperatively and then semen analysis was done postoperatively at 6 month and 1 year follow up.

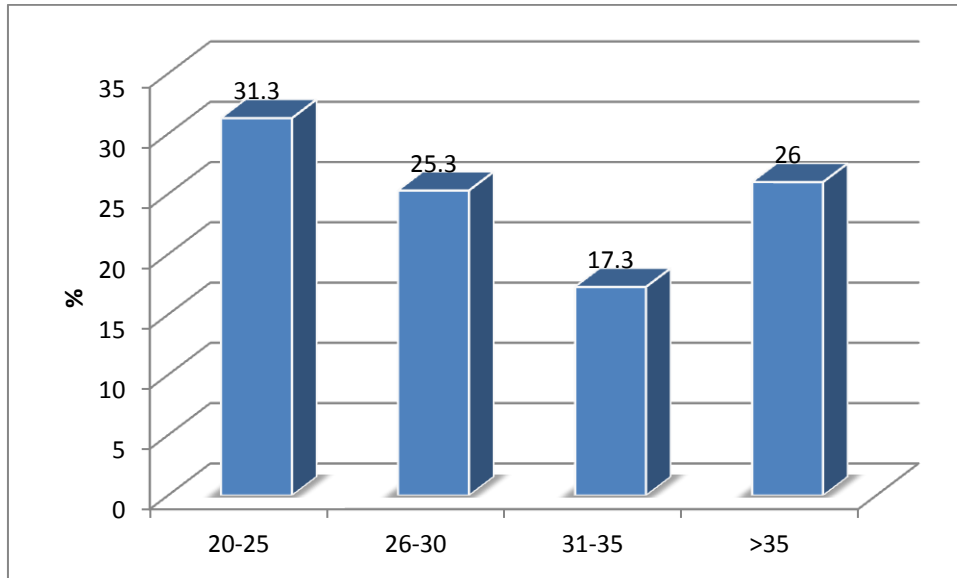
On Semen examination Volume, Liquefaction Time , Total Sperm count , Sperm morphology and Sperm motility was analyzed. Comparison was done in Preoperative and Postoperative sample and check the difference and improvement in spermatogenesis and fertility.

Results

A. Clinical Parameters

1 - Age

All the patients have been divided in various age groups. Majority of them (31.3%) fall between 20-25 year age group



2. Duration of Hydrocele and Pain

- The majority of the patient presented when the duration of their disease was of 3-4 years.

- Pain was present among more than half of patients (60.7%).

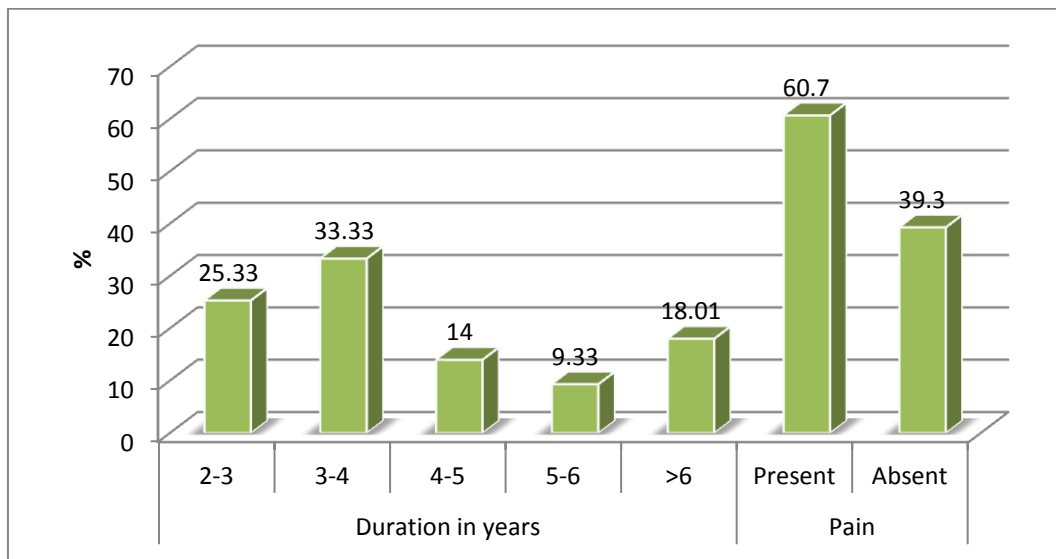


Fig. 2: Distribution of patients according to chief complaint

5- Size

We have divided our patients into three groups clinically

- Mild - Vertical length upto 7.5 cm.
- Moderate - Vertical dimension more than 7.5 cm. and less than 12.5 cm.

- Severe - Vertical dimension more than 12.5 cm.

The majority of hydrocele presented were of moderate size (72%).

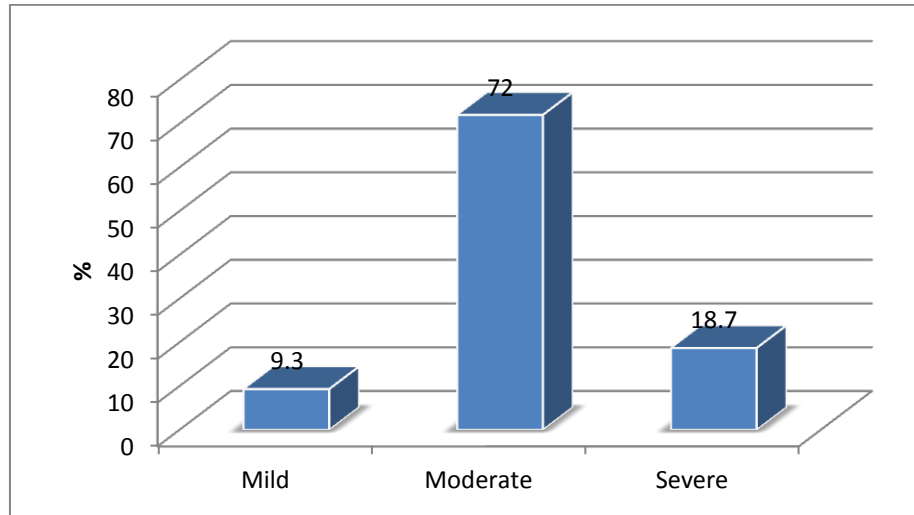


Fig. 3: Distribution of patients according to size of hydrocele

6–Etiology

History suggestive of Filariasis was given by 21 patients and that of trauma was given by 13 patients i.e. 16% and 12% respectively.

B. Peroperative findings

Peroperatively patients were examined for any

1- Gross Changes in Sac, Testes, Epididymis

Out of 120 cases 16 cases had grossly thickened Tunica vaginalis testes i.e. 13.34%. More than

third of patients had ch of tv among whom size of hydrocele was severe (42.9%).

2 – Testes Size

Out of 120 cases 15 cases had decrease in size of testes i.e. 12.5%. More than third of patients had decreased testes size among whom size of hydrocele was severe (46.4%)

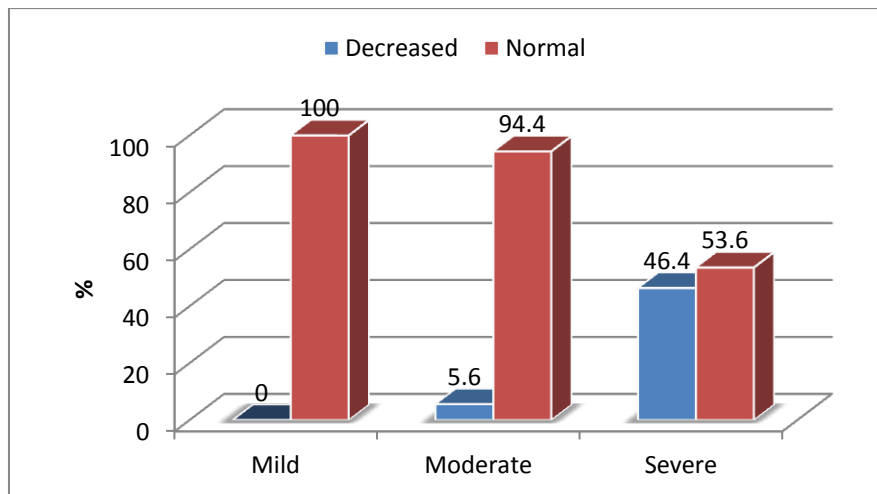


Fig. 4: Association of size of hydrocele with testes size

3 – Shape of Testes

Out of 120 cases 14 cases had showed altered testicular shape i.e. 11.66%.

4. Hydrocele Fluid

During surgery the hydrocele fluid was examined for its colour and amount. Majority of cases had 25-99ml (26%) amount of fluid during surgery.

Amount of fluid varied in our study from 25 to 500 ml average being 180 ml

Table-1: Association of size of hydrocele with amount

Amount	Size of hydrocele						p-value ¹
	Mild (n=11)		Moderate (n=86)		Severe (n=23)		
	No.	%	No.	%	No.	%	
25-99ml	6	57.1	25	29.6	0	0.0	.0002
100-199ml	4	35.7	23	26.9	0	0.0	
200-299ml	1	7.1	17	19.4	2	10.7	
300-399ml	0	0.0	15	17.6	6	25.0	
400-499ml	0	0.0	5	5.6	8	35.7	
>500ml	0	0.0	1	0.9	7	28.6	

P value is .0002 which is significant

5. Colour of fluid

During surgery the hydrocele fluid was examined for its colour. Out of 120 cases in 115 cases the fluid colour was amber or straw coloured, in 3 cases it was haemorrhagic and in 2 it was chylous.

C. Semen Analysis

Semen analysis was done preoperatively and repeated at 6th month and 1 year postoperatively.

Parameters taken were based on WHO Criteria 2010 of Semen Analysis.

1. Volume

Majority of cases had semen volume ≥1.5 that is 80%.

In severe Hydrocele 35.7% cases show Semen volume < 1.5ml which was significant.

In Mild hydrocele only 1 case showed semen volume <1.5ml.

2. Liquefaction Time

In Severe Hydrocele Liquefaction time is around 22min and in Moderate Hydrocele L.Time is around 20min.

3. Total Sperm Count and other Parameters

- Most important parameter in Semen Analysis is Total Sperm count.
- 46.42% of Severe Hydrocele shows total sperm count less than 15million which is significant

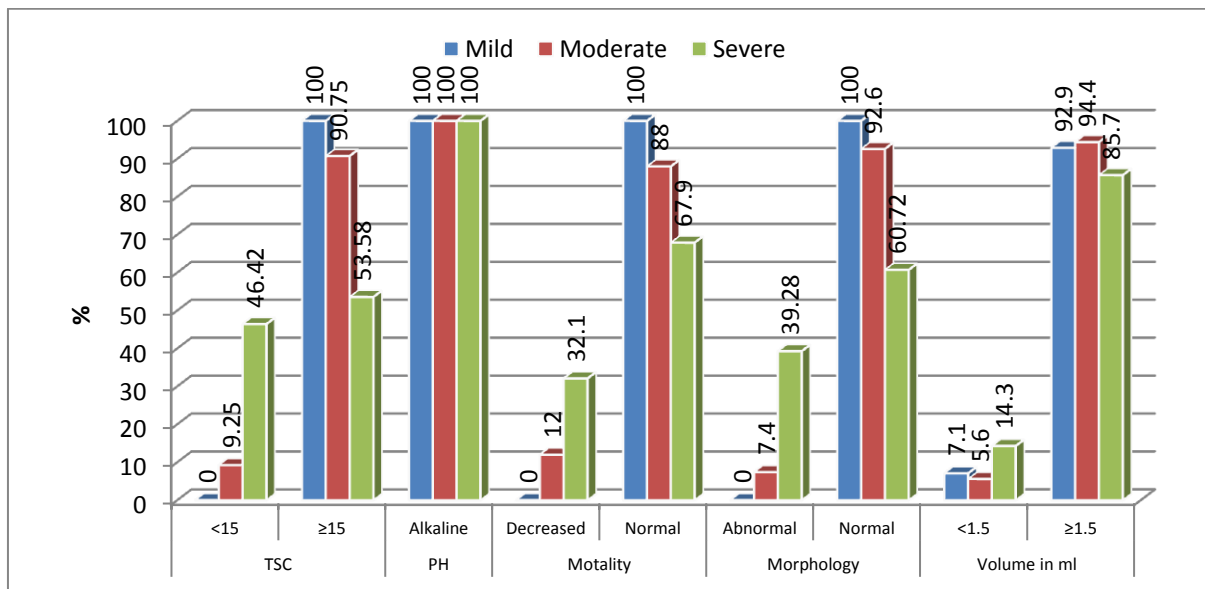


Fig. 5: Association of size of hydrocele with semen analysis at pre-operative

Table-2: Comparison of TSC from pre-operative to follow-ups

TSC	Follow-up time					
	Pre-operative		Post-operative 6 months		Post-operative 1 year	
	No.	%	No.	%	No.	%
<15	18	15.3	9	7.33	2	1.68
≥15	102	84.7	111	92.67	118	98.32

Table-2 shows comparison of TSC from pre-operative to follow-ups. TSC was <15 million/ml in 15.3% patients at pre-operative which became 7.33% at 6 months and 1.3% at 1 year

Fig-6: Comparison of motility from pre-operative to follow-ups & Fig.25 shows comparison of

motility from pre-operative to follow-ups. Decreased motility was in 14.7% patients at pre-operative which became 0.7% at 6 months and nil at 1 year.

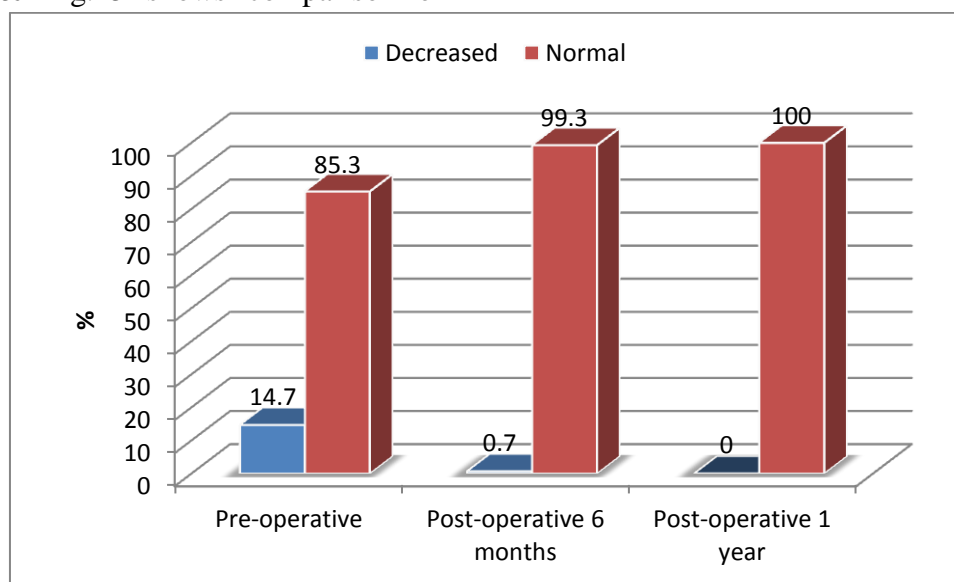


Fig. 6: Comparison of motility from pre-operative to follow-ups

Table-3: Comparison of morphology from pre-operative to follow-ups

Morphology	Follow-up time					
	Pre-operative		Post-operative 6 months		Post-operative 1 year	
	No.	%	No.	%	No.	%
Abnormal	15	12.6	5	4	1	0.83
Normal	105	87.4	115	96	149	99.17

Table-3 shows comparison of morphology from pre-operative to follow-ups. Abnormal morphology was in 12.6% patients at pre-operative which became 4% at 6 months and .67% at 1 year

Discussion

Scrotal hydrocele is one of the commonest conditions in India, resulting from filarial and non-filarialetiology. As it is in the closest surrounding of the testis, it can put some effect over the morphology and functions of testis. We,

therefore, thought to study, this aspect of scrotal hydrocele clinically and Semen Analysis so that a possible relationship between two could be sorted out.

Clinical Study

One hundred and twenty cases of bilateral scrotal hydrocele of different age group were taken up for the study. The youngest being 20 years and eldest 45 years of age with average age being 30.2 years. Majority of our patients were between 20 - 25 years i.e. 31.3%.

Duration of disease varied from 24 months to 96 months (8 years), though majority of our patients presented to us within 5 years of the onset. According to Dedhia⁽⁸⁾ minimum duration recorded was 1 month and maximum was of 12 years and according MP Singh⁽¹³⁾ duration varied from 12 months to 15 Years.

In our society, due to ignorance and illiteracy, people don't give much importance to their problem till it becomes an obstacle in their routine. Same is with hydrocele, patients don't reach to the surgeon till it creates physical, or sexual hindrance, that is why, sometimes they

present even after years of its onset. In the present study 9.25% cases presented between 7 - 8 years after the onset of disease.

In our patients history suggestive of filariasis was found only in 18% cases. Most of them denied association of any fever with chills and rigor with hydrocele swelling may be due to the sub-clinical filarial infection leading to hydrocele.

Comparison of Clinical Findings in Various Studies

The following table reveals some comparative findings in various studies.

Clinical Findings

Sl. No. Parameter	Singh ⁽¹³⁾	Dandapat ⁽⁷⁾	Current study
1. Age(range)	20-60 Yrs	20-40 yrs	20-45 yrs
2. Duration	2Months - 15 yrs	2-5 Yrs	2 - 8 yrs
3. Average Duration(yrs)	5 Yrs	4.8 Yrs	3.5 Yrs
4. History of Filariasis	14%	Not recorded	18%
5. History of Trauma	10%	not recorded	12%
6. Cord thickening	25%	18%	19.57%
Per-Operative Findings			
1. Epididymal thickening	23.2%	12%	14.13%
2. Hydrocele fluid amount	Not recorded	100-600 ml	25-500
3. Average (amount)	Not recorded	300 ml	180 ml
4. Straw colour (% of cases)	94.6%	96.4%	95.4%
5. Perop. Thickened sac	90%	60%	28%
6. Flattening of testis	Not recorded	22%	12.66%
7. Atrophy of testis	7.10%	8%	10.86%
8. Altered testicular surface on appearance	60.6%	Not studied	50%

Semen Analysis

To Evaluate quality of Spermatogenesis, Semen Analysis was done instead of Testicular Biopsy, considering the complications, as Biopsy may lead to Germinal cell Destruction resulting in impaired Spermatogenesis in future.

Testicular Biopsy also lead to formation of Antisperm Antibodies which further lead to impaired spermatogenesis. So, we preferred, Semen Analysis instead of Testicular biopsy to see the effect of Hydrocele on spermatogenesis.

In this section, we have studied, effect of Bilateral Hydrocele on Semen Parameters. As, single Testes is sufficient for spermatogenesis there by showing less alteration in cases of Unilateral hydrocele so therefore we preferred to choose cases with Bilateral Hydrocele.

According to Krahn⁽¹⁰⁾ et al hydrocele causes increased pressure in the surroundings of testes with hardly any change in the scrotal temperature. They found that hydrocele itself does not cause change in testicular morphology. Studies done by Gratania⁽⁹⁾ support the above view. Recent studies done in India by Dedhia⁽⁸⁾ suggest that hydrocele affects the testicular morphology to a varying degree of severity from just thickening of the basement membrane to an arrest of spermatogenesis at various levels and even testicular atrophy. They have encountered these changes in 65% of cases.

Similar study was done by M.P. Singh⁽¹³⁾ they reported testicular change in 52.3% of cases of hydrocele.

They reported minimal spermatogenesis in 45.5%; maturation arrest in 2.3% and testicular atrophy in 4.5%. Another study conducted in Orissa (India) by Dandapat⁽⁷⁾ also shows that there is partial arrest of spermatogenesis in 10% cases and total arrest of spermatogenesis in 8% of cases.

Bhatnagar⁽⁴⁾ have reported that hydrocele has no effect on the testis except an increase of fibrous tissue in the tunica and interstitial area. However, they, observed an arrest of spermatogenesis and consequent testicular atrophy as a result of fluid pressure in the tunica vaginalis. Saifee⁽¹¹⁾ observed arrest of spermatogenesis when the amount of fluid within the tunica is considerable and under tension.

In our study, cases with bilateral hydrocele were studied and Semen analysis was done preoperatively and repeated after 6months and 1year post operatively.

Total Sperm Count

All Cases with mild Hydrocele were normozoospermic, pre and post operatively, whereas preoperatively, 9.25% cases with moderate hydrocele and 46.42% with severe hydrocele showed oligozoospermia.

Postoperatively, 8% and 14% showed improvement in sperm counts 6 months and 1 year later respectively.

Sperm Motility

All cases with mild Hydrocele showed normal sperm motility, pre and post operatively, whereas preoperatively, 12% cases with moderate hydrocele and 32.1% with severe hydrocele showed decrease sperm motility.

Postoperatively, at 6month follow up only 7% of cases showed decrease motility.

Postoperatively, at 1year follow up none of the cases showed decrease motility.

Sperm Morphology

In Severe Hydrocele 39.28% patients showed abnormal sperm morphology such as Giant sperm, Double head sperm, double body sperm, Long head sperm, Abnormal middle piece. Most common being Long head sperm.

In moderate Hydrocele 7.40% of cases showed abnormal sperm morphology. In mild hydrocele none of the cases showed any abnormal sperm morphology.

Postoperatively, only 4% cases and 0.67% cases showed abnormal morphology at 6 month and 1year follow up respectively.

In other studies by Dandapat⁽⁷⁾, Dedhia⁽⁸⁾ each reporting altered testicular histology in 85% and 65% respectively. Studies done by M. P.Singh⁽¹³⁾ showing only 52.2% of cases with altered histology, may be because of the criteria of abnormality they adopted. They omitted the minor changes like thickening of basement membrane etc.

We also assessed Fructose level in semen as fructose denote seminal Vesicle function. Fructose level were normal in all cases. (The lower reference limit for fructose is 13 mol per ejaculate)

By performing statistical analysis using principles outlined in Altmann⁽¹⁾ we did cross table analysis using Chi-square test for categorical data.

By using this test of significance we tried to find out whether the association between Hydrocele and various parameters (clinical, per operative, Semen analysis) was significant or not.

Analysis showed that hydrocele was significantly associated with :

- a) Size Of Hydrocele with Per-operative Tunica vaginalis thickening
- b) Size of Hydrocele with Testes Size and shape.
- c) Size Of Hydrocele with Total Sperm Count, Sperm motility, Sperm Morphology
- d) Duration of Hydrocele with Testicular size, sperm count and morphology

Dandapat⁽⁷⁾ proposed that there is a direct relationship between duration of the hydrocele and the its size, larger the size, greater the pressure effect and pathological changes. They just proposed the relationship as a hypothesis.

In review of literature it is mentioned that there is no association between the lymphatic drainage

from interstitium and the lymph bathing the cells in the tubules. Lymph from interstitium passes through lymphatic channels and reaches to the main lymph vessels in the spermatic cord. Lymph from tubules is discharged with the excurrent system. Lymph vessels draining tunica also reach the main vessels alongwith the cord.

Filarial infection mainly affects the lymphatic channels and may lead to back pressure causing thickening of tunica. Accumulation of fluid in the sac and interstitial edema should directly affect the internal environment of the testis while accumulate on of fluid in the sac leads to increased pressure externally. Interstitial edema may affect seminiferous tubules by causing compression, increase in temperature around them and by dysfunction of leydig cells.

All the above factors should affect both germinal epithelium and sertoli cells. Sertoli cell dysfunction can lead to further change in the microenvironment by lack of androgen binding protein¹⁸ causing defective spermatogenesis.

So, even if testosterone level is normal and there is sertoli cell dysfunction the process of spermatogenesis cannot reach to the end leading to minimal spermatogenesis, maturation arrest and even testicular atrophy.

However, hydroceles encountered in Western countries are usually small and present in early stage, this may be one reason why significant abnormalities of testes have not been recorded in the studies conducted in those countries.

Conclusion

In the present study 120 cases of Bilateral hydrocele of the tunica vaginalis testis were studied clinically, surgically corrected, Semen analysed before and after surgery, then data was statistically analysed to ascertain the effect of hydrocele on structure and function of the test.

- 1) Majority of the patients (72%) were having moderate sized hydrocele.
- 2) History of filariasis was positive in 16% cases.

- 3) History of trauma was positive in 12% of total cases studied.
- 4) There was gross thickening of the tunica vaginalis (sac) in (133.33%) of cases. In sever Hydrocele 42.9% case shows thickening of tunica vaginalis.
- 5) There were gross change in the size and shape of testes in 12.66% of cases. In case of severe Hydrocele 46.4% case shows change in testes size.
- 6) Amount of fluid varied in our study from 25-500ml, average being 180ml.
- 7) Statistical analysis proved that there is a significant association between hydrocele and Semen as –
 - Size of Hydrocele with effect on Testes Size.
 - Size and duration of Hydrocele with Total Sperm Count , Sperm motility, Sperm Morphology
- 8) To sum up it would seem that big hydrocele of long duration impair spermatogenesis.

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