Introduction

Each testis develops from the coelomic epithelium that covers the medial side of the mesonephros [1]. This is indicated by the appearance of an area of thickened germinal epithelium on the medial side of mesonephric ridge in the 5th week. This thickening is known as genital or gonadal ridge. Upto the 7th week the gonad has no differentiating feature. Then the rapidly proliferating germinal epithilium forms a number of solid gonadal or sex cords, separated by mesenchyme. These cords remain at the periphery of the primordium to form a cortex and in the centre, proliferation of the mesenchyme of mesonephros constitutes medulla [1]. The cells derived from the surface of gonad form the supporting cells of sertoli. These tubules remain solid until 5th to 6th month. With the incorporation of primordial germ cells into the cords and canalization, seminiferous tubules are formed. The cords that are not canalized the interstitial cells of testis, some of which are also derived from the interstitial cells of testis, which are also derived from the surrounding mesenchyme [2]. The mesenchymal cells surrounding the developing the testis, form a dense fibrous layer called the tunica albuginia. The Leydig cells are seen by the 3rd month. Between 8th and 11th week the testes shorten and broaden [3]. The scrotal pouch is situated below the penis and pubic symphysis containing the testes, epididymis and lower portions of the spermatic cord. It is divided into two sacs by a partial median raphe or septum which continues into the perineal skin posteriorly and anteriorly along the lower aspect of the penis. The homologue of this raphe in females remains separated to form the labia majora. The cases admitted to the surgical wards in Medical College Hospital and Research Center, formed the material for this study. During this period 100 cases with h/o scrotal swelling admitted in various surgical units, selected at random were studied in detail as per proforma. Jaboulay procedure was the most common surgery done for hydrocele followed by Lorde\’s plication and partial excision. Open varicocelectomy was done in 11 cases and laparoscopic in 2 cases. Orchidectomy was done in 7 cases, four for testicular tumor and 3 cases were for torsion testis. Orchidopexy was done in 3 cases of torsion where the affected testis was found viable. Debridement and Incision Drainage were done for Fourniers and Scrotal abscess respectively.

Keywords: Treatment modalities, scrotal swellings, outcome

Abstract

The scrotal pouch is situated below the penis and pubic symphysis containing the testes, epididymis and lower portions of the spermatic cord. It is divided into two sacs by a partial median raphe or septum which continues into the perineal skin posteriorly and anteriorly along the lower aspect of the penis. The homologue of this raphe in females remains separated to form the labia majora. The cases admitted to the surgical wards in Medical College Hospital and Research Center, formed the material for this study. During this period 100 cases with h/o scrotal swelling admitted in various surgical units, selected at random were studied in detail as per proforma. Jaboulay procedure was the most common surgery done for hydrocele followed by Lorde\’s plication and partial excision. Open varicocelectomy was done in 11 cases and laparoscopic in 2 cases. Orchidectomy was done in 7 cases, four for testicular tumor and 3 cases were for torsion testis. Orchidopexy was done in 3 cases of torsion where the affected testis was found viable. Debridement and Incision Drainage were done for Fourniers and Scrotal abscess respectively.

Keywords: Treatment modalities, scrotal swellings, outcome
The dartos muscle responds to changes in the temperature or following sexual excitation by contracting or relaxing accordingly. In cold environments it contracts and gives the wrinkled appearance to the scrotal skin. In, warm environment it relaxes. This action helps in maintaining a steady range of temperature for testicular spermatogenesis, which occurs at a temperature few degrees below the normal body temperature. Dartos is supplied by sympathetic fibres carried from the perineal branch of S2[3,6].

External spermatic fascia is a continuation of the external oblique aponeurosis. A few fibres from the internal oblique muscle form the cremasteric muscle. The loop like fibres of cremasteric fascia form a partial investment for the testis and spermatic cord. The fibres are fused to the parietal layer of tunica vaginalis along with the internal spermatic fascia, a continuation of the transversalis fascia. Contraction of this muscle-fibrous layer draws the testis into the sub-inguinal pouch and protects it from injury.

Tunica vaginalis testis is a serous cavity derived from the vaginal process of peritoneum but cut-off from it by obliteration of the processus vaginalis. It provides a covering for most of the testis and epididymis. It has a visceral and parietal layer with a potential space in-between. The visceral layer is firmly adherent to tunica albuginea of testis and dips between the upper part of testis and epididymis forming a pouch called the sinus of epididymis. The visceral layer extends upwards for a short distance along with the spermatic cord. The parietal layer is separated from the scrotum by a fine layer of extra vaginal cellular.[6].

The anterior scrotum derives its blood supply from the external pudendal artery, which is a branch of the femoral artery. Posteriorly scrotum is supplied by branches of internal pudendal artery, which is a branch of the femoral artery. The venous drainage is into the femoral vein.

Methodology
The cases admitted to the surgical wards in Medical College Hospital and Research Center, formed the material for this study. During this period 100 cases with h/o scrotal swelling admitted in various surgical units, selected at random were studied in detail as per proforma.

The method of study followed consists of:
- Detailed history taking and physical examination.
- Local examination of scrotum and its contents with relevant lymphatic and systemic examination.
- Routine laboratory investigations including examination of hydrocele fluid in some cases.
- Relevant special investigations.
- Surgical treatment according to the merits of the case as decided by the attending surgeon, under suitable anaesthesia.
- Operative findings, post operative course and treatment.
- Post operative complications, histopathological correlation (if any). Duration of hospital stay and follow up.

The follow up in these cases was generally poor. The relevant data from the 100 cases was tabulated in a master chart, under different headings.

Results

Table 1: Treatment Modality

| Nature of treatment | Number of cases | Percentage |
|---------------------|-----------------|------------|
| Surgical treatment  |                 |            |
| Definite operation  | 90              | 90%        |
| Biopsy              | 01              | 01%        |
| Medical treatment   | 09              | 09%        |
| (conservative)      |                 |            |
| Total               | 100             | 100        |

Out of the 100 cases in this study, definitive operation was done for 90 cases. For one case testicular biopsy was done for diagnosis of infertility. 09 cases were put on medical line of management line of management. 2 cases among these were diagnosed to be secondary to tuberculosis and were put on ATT.

Table 2: Type of anaesthesia

| Anaesthesia | Number of cases | Percentage (%) |
|-------------|-----------------|----------------|
| Spinal      | 84              | 92.3%          |
| General     | 01              | 1.09%          |
| Local       | 06              | 6.59%          |
| Total       | 91              | 100            |

84 cases were operated under spinal anaesthesia, 1 cases were operated under general anaesthesia and 6 cases (including biopsy) under local anaesthesia.

Table 3: Emergency vs elective surgery

| Number of cases operated | Elective | Emergency |
|--------------------------|----------|-----------|
| 91                       | 71(78.2%)| 20(21.8%) |

A total of 20 cases were done on emergency basis. These were 5 cases of torsion testis, 9 cases of Fournier’s gangrene, 5 cases of scrotal abscess and one case of scrotal abscess with torsion.

Table 4: Nature of definitive operative treatment

| Operation done | Number of cases | Percentage (%) |
|----------------|-----------------|----------------|
| Jaboulay’s procedure | 30 | 32.9% |
| Lord’s plication     | 09 | 10.2% |
| Partial excision and eversion of sac | 06 | 6.88% |
| Varicocelectomy      |     |      |
|  - Open              | 11  | 12.5%|
|  - Laparoscopic      | 02  | 2.2% |
|  - Orchidectomy      | 07  | 8.45%|
| Derotation and Orchidopexy | 03 | 3.4% |
| Incision and Drainage| 05  | 5.68%|
| Debridement          | 09  | 11.2%|
| Excision of cyst     | 06  | 6.7% |
| Excision of sac with hernioplasty | 02 | 2.2% |
| Biopsy               | 01  | 1.4% |

Jaboulay procedure was the most common surgery done for hydrocele followed by Lords plication and partial excision. Open varicocelectomy was done in 11 cases and laparoscopic in 2 cases. Orchidectomy was done in 7 cases, four for testicular tumor and 3 cases were for torsion testis. Orchidopexy was done in 3 cases of torsion where the affected testis was found viable. Debridement and Incision Drainage were done for Fourniers and Scrotal abscess respectively.
The post operative complication rate in this study (39.5%) was quite high. The criteria were mild edema of scrotum, haematoma of scrotum and wound infection. Edema/ haematoma was seen in 20 cases and were treated conservatively. Wound infection cases responded to regular change of dressings with antibiotics.

Table 5: Post-operative complications

| Complication        | Number of cases | Percentage |
|---------------------|-----------------|------------|
| Haematoma /edema of scrotum | 20             | 22.00%     |
| Wound infection     | 16              | 17.5%      |
| Uncomplicated        | 55              | 60.5%      |

The above table shows the distribution of complications with various surgeries. The highest complication rate was seen with emergency surgeries mainly comprising of torsion testis, Fournier’s gangrene etc. In surgeries for hydrocele, the highest complication rate was seen with Jaboulay’s procedure (40%) and partial excision of sac (33.3%).

Table 6: Distribution of complication according to mode of surgery

| Procedure                          | Number | Complication | Percentage (%) |
|------------------------------------|--------|--------------|----------------|
| Jaboulay’s procedure               | 30     | 12           | 40             |
| Lord’s plication                   | 09     | 02           | 22.2           |
| Partial excision and eversion of sac | 06     | 02           | 33.3           |
| Orchidectomy                       | 07     | 03           | 42.8           |
| Orchidopexy                        | 03     | 01           | 33.3           |
| Others                             | 36     | 16           | 44.5           |

The commonest complication following any surgery on the scrotum was edema of the scrotum. In this study which was seen in 20 cases and were treated conservatively. Wound infection cases responded to regular change of dressings with antibiotics.

Table 7: Incidence of haematoma, edema and wound infection in various hydrocele surgeries

| Name of surgery       | No. of cases | No. of Haematoma | No. of Edema | No. of wound infection |
|-----------------------|--------------|------------------|--------------|------------------------|
| Jaboulay’s procedure  | 30           | 03               | 02           | 07                     |
| Lord’s plication      | 09           | 01               | 00           | 01                     |
| Orchidectomy          | 07           | 01               | 00           | 02                     |
| Partial exc./eversion of sac | 06     | 00               | 00           | 02                     |
| Orchidopexy           | 03           | 00               | 01           | 00                     |
| Others                | 36           | 04               | 08           | 04                     |

The commonest complication following any surgery on the scrotum was edema of the scrotum. In this study which was seen in 11 cases, haematoma in 09 cases, and wound infection in 16 cases.

Discussion

Table 8: Incidence of haematoma in various series of hydrocele operations

| Author and year        | Procedure | Lord’s plication No. of haematoma cases | Excision/eversion of sac No. of haematoma cases |
|------------------------|-----------|----------------------------------------|-----------------------------------------------|
| Present study          | Lord’s plication | 9                                      | 1                     |
| Peter lord (1964)      | NIL       | 22                                      | NIL                      |
| Effron, Sharkey (1967) | NIL       | 29                                      | 1                     |
| Dahl et. al. (1972)    | NEG       | 25                                      | -                      |
| Reddy, Srinivas (1973) | NEG       | 400                                     | -                      |
| Rai, Goyal, Singh (1979)| NIL     | 50                                      | -                      |
| Campbell (1972)        | -         | 502                                     | 12                     |

The results of the present study are comparable to that of previous workers. Haematoma was seen in 1 case operated by Lords plication. In those treated by partial excision/ excision of sac haematoma was seen in 3 cases. This study shows that compared to conventional methods of treatment of hydrocele, i.e. excision/partial excision of sac, Lord’s plication gave rise to less complications and morbidity. The plication procedure avoids the opening of the cleavage between the sac and surrounding tissue, thus reducing the oozing and subsequent haematoma formation.

Table 9: Comparision of hydrocele operation results with the recent studies (O.P. Agarwal, 1983)

| Nature of Operation | Number of cases | Post-operative complications |
|---------------------|-----------------|-----------------------------|
|                      | Series          | Agarwal                | Present | Haematoma | Infection |
| Lord’s Plication    | 50              | 9                       | NIL     | 1(11.1%)  | NIL       | 1 (11.1%) |
| Excision of sac     | 50              | 39                      | 14 (28%) | 3(7.7%)   | 8 (16)    | 9 (23%)   |

The results of the present study are fairly comparable to that of Agarwal series, “except the high rate of infection seen with Jaboulay’s / Excision of sac.

Conclusion

- The patients were treated with surgery or conservative medical line. Definitive surgery was done in 90 cases. Penicillin/cephalosporins/ampicillin/gentamicin were commonly used antibiotics.
- Most of the surgeries were done under spinal anaesthesia (84%).
- Various forms of hydrocele constituted a major portion of the study (50 cases), followed by varicocele.
- Jaboulay’s procedure was the commonest operation done (30 cases) followed by lord’s plication in 9 cases.
- Amongst the various operations for hydrocele, Lord’s plication was associated with the least number of complications. Of the 9 cases treated by this procedure, one case had haematoma and 1 case had wound infection.

References

1. Courtney Townsend M Jr., MD Daniel Beauchamp R, MD Mark Evers B, MD Kenneth Mattox L. Urological surgery sabiston textbook of surgery, 19th Edition. 2012; 2(73);2046-76.
2. Bullock N et al., Tetracycline sclerotherapy for hydrocele and epidydymal cyst; British Journal of Surgery. 1987; 59:340-342.
3. CassidD Jarvik, Garbar Lokvariocice. Surgery Canadian Urology Association, Aug., 2012, 266-8.
4. Breda G. Treatment of hydrocele-Randomised prospective study of simple aspiration and sclerotherapy with tetracycline. British journal of Urology. 1992; 70:76-7.
5. Wilkensky OA, Samuels SS. Acute diffrentitis and funiculitis; Annals of Surgery, 2007, 69.
6. Magoha GA. Local infiltration and spermatic cord block for inguinal, scrotal, and testicular surgery. East Africans Medical Journal. 1998; 75(10):579-81.
7. Lord PH. A bloodless operation for spermatocele or cyst of epididymitis. British journal of surgery. 1970; 8:641-44.
8. Effron G, Sharkey CG. The Lords operation for hydrocele. Surgery Gynaecology and Obstetrics. 1967; 125:603-6.
9. Reddy RSN, Srinivas A. The Lord Operation for radical cure of hydrocele; Indian Journal of Surgery; March. 1973; 35:136-138.
10. Rai S, Gayal SC et al., Plication operation for hydrocele, Indian Journal of Surgery. 1978; 40:481-484.
11. Campbell MF. Hydrocele of tunica vaginalis – study of 502 cases; Surgery, Gynaecology and Obstetrics. 1927; 45:192-200.