A CLINICAL STUDY ON SLIDING INGUINAL HERNIAS
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HOW TO CITE THIS ARTICLE:

ABSTRACT: INTRODUCTION: A sliding hernia is a type of hernia in which posterior wall of the sac is not only formed by the parietal peritoneum, but also by sigmoid colon with its mesentery on its left side; caecum on right side and often with portion of bladder in both sides. During surgery care is taken not to separate the content from the sac as the posterior wall of the sac is formed by the sliding component itself and attempts to dissect it from wall results in vascular injury to the structure and end in ischemic insult of the sliding component. Thus sliding hernia is important for the special surgical technique and care during intraoperative period which decreases the morbidity. AIMS AND OBJECTIVES: To study the incidence of sliding hernia in S.V.R.R.G. General Hospital Tirupati. To know the presentation, organ involved in the sliding, post-operative complications in the management of sliding hernias. METHODOLOGY: STUDY DESIGN: Prospective Clinical Study, STUDY AREA: Sri Venkateswara Medical College Tirupati. SOURCE OF DATA: This study is an observational study in which 600 patients with hernia were studied and 40 patients with sliding component during intra operative period were studied in a period of 12 months. SAMPLE SIZE: 40 patients fulfilling the inclusion criteria. METHOD OF COLLECTION OF DATA: Detailed history taking, Complete clinical examination, Appropriate Investigations Blood & Urine Examination, USG, Surgery is performed & Operative findings were recorded. INCLUSION CRITERIA: Patients more than 13 years, with inguinal hernia giving written informed consent. EXCLUSION CRITERIA: Patients less than 13 yrs. Patients with comorbid conditions like heart diseases, liver and renal diseases. SOFTWARE: Statistical software mainly SPSS 11.0 and Systat 8.00 was used for the analysis of the data and Microsoft word and excel have been used to generate graphs tables etc. CONCLUSION: In the observational study done on 40 cases of sliding inguinal hernias 38(95%) and female were 2(5%) cases, with peak incidence in 25 cases (63%) of sliding hernia was around 51–70 years. 29 cases (73%) are indirect inguinal hernias and only 11 cases (27%) are direct inguinal hernia. Duration of symptomatic period ranging from 2 years to 17 years, incidence of the sliding hernia is seen more when the duration is between 5-12 years. 13 cases (32%) sigmoid colon; in 17 cases (43%) caecum; in 10 cases (25%) bladder is the sliding component. Only in 3 cases seroma and infection was noted accounting for 7% each and in the remaining 34 cases 86% recovered without any complications. Only one case presented with obstruction. KEYWORDS: Sliding Hernia, Strangulation, Sac Dissection.

INTRODUCTION: A sliding hernia is a type of hernia in which posterior wall of the sac is not only formed by the parietal peritoneum, but also by sigmoid colon with its mesentery on its left side; caecum on right side and often with portion of bladder in both sides.
The sliding hernias usually do not have special clinical presentation that differs it from other type of hernia. But it should be suspected in long standing complete hernias which are not reducing completely. Diagnosis of this condition preoperatively is not possible and is usually an intra-operative finding.

A sliding hernia is a protrusion through an abdominal wall opening of a retroperitoneal organ, with or without its mesentery, with or without an adjacent peritoneal sac. This organ may be the caecum, ascending colon, or appendix on the right side, the sigmoid colon on the left side, or the uterus, fallopian tubes, ovaries, ureter, and bladder on either side.

Nothing so tests the surgeon’s knowledge of the anatomy of the inguinal region as a chance encounter with a sliding hernia. If Condon’s\textsuperscript{1} dictum “The anatomy of the inguinal region is misunderstood by some surgeons at all levels of seniority” is correct, it is safe to say that sliding hernias are understood by few surgeons at any level of seniority. Few surgical procedures have had so many illustrations attempting to explain the mechanism of the “Slide” and its surgical treatment; yet they have served only to complicate and confuse the picture. What surgeon about to start a practice has not worried about a strangulated sliding hernia presenting in the middle of the night! “Sliders” are simple to treat.

**PATHOPHYSIOLOGY:** The mechanism whereby the viscus or viscera “slide” has not been fully explained. Before the slide can take place, however, there must be a widening of the internal inguinal ring; this is the precondition of an indirect inguinal hernia.

Sir Arthur Keith (1866–1955) proposed that, developmentally, the caecum and ascending colon do not complete their rotation to the right side, and thus the caecum slides inferiorly toward not only the right but also the left internal inguinal ring.

Moschowitz.\textsuperscript{2} in 1925 presented his “Pulling-pushing” mechanism whereby an inguinal sac enlargeing through a widening internal ring exerts a pull on the caecum or ascending colon, whereas anterior structures such as the urinary bladder would be pushed through the posterior inguinal wall by intra-abdominal pressure.

Graham.\textsuperscript{3} of Toronto suggested another possible mechanism: over long periods the layers of the mesentery (Especially of the sigmoid) separate, allowing the bare posterior aspect of the viscus to slide and protrude through an enlarged internal ring. The common initial factor is always the widened internal inguinal ring.

The **Bendavid classification** of sliding hernias in the past may have been partly responsible for some confusion. Since there are three types of sliding hernias, it is probably simplest to call them types I, II, and III in descending order of frequency.
FIGURE NO. 1: SLIDING HERNIA

CAECUM AND APPENDIX ON RIGHT SIDE

SIGMOID COLON ON LEFT SIDE

Fig. 2: Types Of Sliding Hernias
Type I: any hernia in which part of the peritoneal sac is made up by the wall of a viscus. This is the commonest type and accounts for nearly 95% of sliding hernias. This type has also been referred to as intramural, para saccular, and viscero parietal.

Type II: any hernia containing a retroperitoneal viscus and its mesentery, in which the mesentery forms part of the wall of the peritoneal sac. About 5% of sliding hernias are of this type, which has also been named intrasaccular, extrasaccular, and visceromesenteric.

Type III: a protrusion of the viscus itself; the peritoneal sac may be very small or even absent. This is the rarest type and is found in only one of 8,000–10,000 hernia. This type is the most treacherous and its diagnosis requires a high index of suspicion. It has been described as extraperitoneal, sac less, and extrasaccular sliding hernia.

An additional type, although not truly a sliding hernia, is the so-called “Incipient slider.” When the sac is opened, one can see the viscus, but it has not yet entered the internal inguinal ring.

Clinical Characteristics: Sliding hernia diagnosis pre operatively is difficult. So large size globular hernia should arouse suspicion of a sliding hernia and on the right side caecum, appendix or urinary bladder may form the sliding component. The diagnosis is usually made intraoperatively on surgical exploration for inguinal hernia.

In infants findings of sliding hernia are more common in females reported in 20% of cases whereas in adult sliding hernias are almost present in males. In our case male patient had right inguinal-scrotal swelling for past 12 years.

Sliding hernia had been reported in 6-8% of all hernia cases. It tends to developed in patients of old age and in those who had symptoms are for quite long time. It had been reported in one of the study that mean age of presentation of sliding hernia in adult is 53.4 years and mean duration of symptoms was reported to be 2.87 years.

There has been a case report to diagnose sliding hernia containing urinary bladder. It was identified by plain abdominal X-ray showing urinary bladder calculi in groin. After the age of 50 years the incidence of sliding hernias is 3.5 times more frequent. There is a history of previous inguinal surgery, and are easily reducible preoperatively.

The incidence of sliding inguinal hernias increases with the age of the patient, being nearly zero before the age of 30 years and increasing to as much as 20% after the age of 70 years. In the pediatric population boys are not subject to sliding hernias, whereas in “Female pediatric patients, inguinal hernias are usually sliding hernias” with the mesosalpinx adherent to one side of the sac (type II). frequently the ovary and/or fallopian tube are involved. The round ligament may be resected, but the sac itself must not be ligated “high” lest the ovary/tube be damaged. Unusually sac may contain Ovary, fallopian tube, urinary bladder, colonic diverticula, Meckel’s diverticulum (Littre’s hernia) or persistent Mullerian duct syndrome have been reported.
In 1735, Claudius Amyand first reported the presence of perforated appendicitis within an inguinal hernial sac. He performed transherniotomy appendicectomy, this being the first ever appendicectomy reported in literature.\(^7\)\(^8\) the incidence of vermiform appendix in inguinal hernia sac is approximately 1% of all inguinal hernias, whereas appendicular sliding inguinal hernia is even rarer.\(^9\)

**Strangulated Sliding Hernia:** Blood supply to the bowel is impaired leading to ischemia. Gangrene occurs in 5-6 hours. Femoral hernia has a narrow neck and more likely to get strangulated. Indirect hernias mostly get strangulated.

During surgery care is taken not to separate the content from the sac as the posterior wall of the sac is formed by the sliding component itself and attempts to dissect it from wall results in vascular injury to the structure and end in ischemic insult of the sliding component.

Thus sliding hernia is important for the special surgical technique and care during intraoperative period which decreases the morbidity.

**AIMS AND OBJECTIVES:**

1. To study the incidence of sliding hernia in S.V.R.R.G. General Hospital Tirupati.
2. To know the presentation, organ involved in the sliding, post-operative complications in the management of sliding hernias.

**OPERATIVE TECHNIQUE:** The preferred method of repair is Hernioplasty. Should ice technique, Bassini repair was done previously. In brief, the Cremaster muscle is divided longitudinally for better access to the spermatic cord and internal ring. The cord is then separated from the sliding hernia sac, and the dissection stays close to the cord, its investing fascia and adipose tissue.

The internal ring, already wide, allows separation of the transversalis fascia about the neck of the sac. It is important to realize at this stage that the posterior lamina of the transversalis fascia may in itself form a constricting ring around the hernia, separate from the anterior lamina of the transversalis fascia. Constricting tissue, if scarred, can be safely incised at
the anterior or medial aspect of the constricting ring. The viscus is invariably found on the posterior and lateral aspect of the internal inguinal ring.

Gentle dissection in this area frees all adhesions and allows sac and sliding viscus to return to the preperitoneal space. If it can be done safely, the sac may be opened for inspection and then closed; it need not be resected. High ligation of the sac should never be attempted, as it is not necessary. A counter incision has never been needed. If in doubt as to the nature of a thick-walled sac, do not open it! It could be the wall of bowel, as seen in the sac less variety or type III slider.

The remainder of the operation is devoted to the reconstruction of the posterior inguinal wall by the chosen technique of the operating surgeon.

**METHODOLOGY:** This study is an observational study in which 600 patients with hernia were studied and 40 patients with sliding component during intra operative period were studied from the time of 12months.

**Inclusion Criteria:** Patients more than 13 years, with inguinal hernia giving written informed consent.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>38</td>
<td>95</td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table 1: Sex Incidence**

**Exclusion Criteria:** Patients less than 13 yrs. Patients with comorbid conditions like heart diseases, liver and renal diseases.

Patient fulfilling the inclusion and exclusion criteria are selected. Written and informed consent is taken. Demographic data like name, age, sex, occupation, economic status, literacy status noted.

All patients were operated with inguinal incision and intra operative findings; operative procedure and post-operative stay in the hospital was recorded.

The collected data is analyzed and statistics were made according to need.

**Software:** Statistical software mainly SPSS 11.0 and Systat 8.00 was used for the analysis of the data and Microsoft word and excel have been used to generate graphs tables etc.
ANALYSIS:

TABLE NO 1: SEX INCIDENCE

<table>
<thead>
<tr>
<th>Age</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>31-40</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>41-50</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>51-60</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td>61-70</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>71-80</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>

In the present study, 40 cases of sliding hernia, 38 cases 95% are male and 2 cases 5% are female. This shows a male predominance in the sliding hernia as in general hernia presentation.

Table 2: Age Distribution
In the study patients from age group of >30 years was taken and the peak incidence around 63% of sliding hernia is present around 51 – 70 years. These is because longer duration of disease and old age are precipitating factors for the development of sliding hernia and the risk increases with age but due to decreased longevity cases beyond 70 years are few in number.

<table>
<thead>
<tr>
<th>Side</th>
<th>Direct</th>
<th>Indirect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Left</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Bilateral</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>29</td>
</tr>
</tbody>
</table>

Table 3: Laterality of Hernia

Graph 2: Age Distribution

Graph 3: Laterality of Hernia
Among the 40 cases studied 29 cases 73% are indirect inguinal hernias and only 11 cases 27% are direct inguinal hernias. And this shows that sliding hernia can occur both in direct hernia with bladder as a sliding component and in indirect hernia with caecum and sigmoid colon as the components; but incidence is more in indirect hernia.

<table>
<thead>
<tr>
<th>Duration in years</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2Y</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3Y-4Y</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>5Y-6Y</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>7Y-8Y</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>9Y-10Y</td>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>11Y-12Y</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>13Y-14Y</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>15Y-16Y</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>&gt;17Y</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table 4: Duration of Complaints

In the present study of 40 cases, patients had varied duration of symptomatic period ranging from 2 years to 17 years. Incidence of the sliding hernia is seen more when the duration is between 5 years and 12 years.

From the study it is evident that longer the duration of disease more is the incidence of sliding hernia but as longevity decreases as the age advances because of the associated co-morbidities.
In the present study, sliding hernia is seen in both the direct and indirect hernias but more in the indirect hernias. In a case appendix was noted as the sliding component and in 13 cases 32% sigmoid colon; in 16 cases 40% caecum; in 10 cases 25% bladder is the sliding component.
Fig. 5: Sliding Hernia with Caecum and Appendix

Fig. 6: Sliding Hernia with Sigmoid Colon on Lt Side

Fig. 7: Sliding Hernia with Sigmoid Colon
In the present study only one case presented with complication like intestinal obstruction with pregangrenous bowel in the sliding hernia; and the rest of the cases presented with inguino scrotal swelling.
Complications | Number | Percentage
--- | --- | ---
Wound infection | 3 | 7
Seroma | 3 | 7
Normal | 34 | 86
Total | 40 | 100

Table No 7: Post-Operative Complications

All the 40 cases were operated and in 3 cases seroma and infection was noted accounting for 7% each and in the remaining 34 cases 86% recovered without any complications.

**DISCUSSION:** From the present observational study in which 600 patients with hernia and 40 patients with sliding component during intra operative period were studied and the following results were discussed.

<table>
<thead>
<tr>
<th>S No</th>
<th>Type of surgery</th>
<th>Number of surgeries</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hernias</td>
<td>550</td>
<td>92</td>
</tr>
<tr>
<td>2</td>
<td>Sliding hernias</td>
<td>50</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>600</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 8: Incidence of Sliding Hernia
Over this period around 600 cases of hernia are being done and around 50 cases are sliding type accounting for 8.3%.

This coincides with the observations of Ryan.10,11, Glassow.12 and Welsh.13 sliding inguinal hernias account for 8% of groin hernias.

**SEX INCIDENCE:** In the present study; women account for 5% of the cases. In the series of Ryan et al.10,11 women made up only 1% of the 3,000 patients analyzed. The incidence of sliders in girls was 21% in two series by Goldstein and Potts.14 and Gaus. This variation is may be because of small study group compared with the study.

**AGE INCIDENCE:** In the present study the age groups between 51 – 70 years are affected with average of 60 years and that of in the series of Ryan et al.10,11 average age of patients was 59.3 years. The incidence of sliding inguinal hernias increases with the age of the patient, being nearly zero before the age of 30 years and increasing to as much as 20% after the age of 70 years.

**LATERALITY OF THE HERNIA:** In the present study 55% cases are of right sided hernia and 43% were of left sided hernias and one case is bilateral. So the left to right ratio is 1.2:1 and in Maingot.15 1.5 to 1 preponderance of right sided sliders. In the series of Ryan et al.10,11 8% were bilateral.

**PREVIOUS SURGERY FOR INGUINAL HERNIA:** In the present study 3 cases 13.3% are having a history of previous surgery and in Maingot.22 9% there is a history of previous inguinal surgery.

**DURATION OF HERNIA:** Sliding hernia is maximum in the patients with complaints of more than 10 years and in Maingot.15 it is on an average it is 11.8 years.
PREOPERATIVE COMPLICATIONS
Except for one case of obstruction no one presented with obstruction and in Maingot, 94% of sliders are easily reducible preoperatively

POST OPERATIVE COMPLICATIONS: Among the 40 cases operated 7% cases developed seroma and infection. There were no deaths due to pre-operative evaluation and selection of cases.

In the series of Ryan et al. 2 patients died following surgery, 1 from a coronary thrombosis on the third postoperative day, the other from a cerebral hemorrhage 2 weeks after surgery. Not a single patient developed a bowel obstruction. Wound infection remained constantly below 1%.

SUMMARY: In the observational study done on 600 cases of inguinal hernias in S.V.R.R.G. General Hospital during the period of 2013-2014 were summarized here.

1. Among the 40 cases of sliding hernias male patients were 38 (95%) and female were 2(5%) cases.
2. In the study the peak incidence in 25 cases (63%) of sliding hernia was around 51 – 70 years.
3. Among the 40 cases studied 29 cases (73%) are indirect inguinal hernias and only 11 cases (27%) are direct inguinal hernias.
4. Duration of symptomatic period ranging from 2 years to 17 years, incidence of the sliding hernia is seen more when the duration is between 5 - 12 years.
5. Among 40 cases 13 cases (32%) sigmoid colon; in 17 cases (43%) caecum; in 10 cases (25%) bladder is the sliding component.
6. Only in 3 cases seroma and infection was noted accounting for 7% each and in the remaining 34 cases 86% recovered without any complications.
7. Only one case presented with obstruction.

CONCLUSION: From the present study done on 40 cases of sliding hernia the following conclusions were made. The sliding hernias usually do not have special clinical presentation that differs it from other type of hernias. It is common in male patients with long duration of complaints and in old age group. This may be due to age related weakness of the abdominal tone. The sliding hernia should be suspected in long standing complete hernias which are not reducing completely. Diagnosis of this condition preoperatively is not possible and is usually an intra-operative finding. From the present study sliding hernia is more common in indirect inguinal hernias than in direct inguinal hernias.

Sigmoid colon forms the component in left side and caecum, appendix forms the content in right side in indirect inguinal hernias and bladder forms the sliding component in direct hernia.

During surgery care is taken not to separate the content from the sac as the posterior wall of the sac is formed by the sliding component itself and attempts to dissect it from wall results in vascular injury to the structure and end in ischemic insult of the sliding component.
Pre-operative complications were rare in sliding hernias as the main pathology is abdominal weakness and neck of the sac is rarely small enough to constrict the content.

Thus sliding hernia is important for the special surgical technique and care during intraoperative period which decreases the morbidity. Common post-operative complications are wound infection and seroma formation.

REFERENCES:

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