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Femoral Hernia in the Female

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ABSTRACT

A study of 384 consecutive femoral herniorrhaphies performed upon female patients admitted to Shouldice Hospital, Toronto, during a 19-year period was carried out. Its main purpose was to describe the techniques used and to evaluate the results obtained. A careful 10-year follow-up plan for all cases existed.

Two hundred and ninety-three operations were performed for the repair of simple femoral hernia; 91 were performed for the repair of femoral hernia which had developed following an initial ipsilateral inguinal or femoral repair performed previously, either in this hospital or elsewhere.

The basic repair was subinguinal. Four modifications are described, one entirely subinguinal and three combined with exploration of the inguinal canal.

The recurrence rate for simple femoral hernia in the female was 1.3% and for "recurrent" femoral hernia in the female, 5.5%.

SOMMAIRE

On a passé en revue 384 herniorraphies crurales, effectuées consécutivement sur des femmes admises à l'Hôpital Shouldice de Toronto, pendant une période de 19 ans. Le but principal de ce travail était de décrire les techniques employées et d'évaluer les résultats obtenus. Une période de post-observation de 10 années existait pour tous les cas.

Du nombre d'opérations, 293 ont été effectuées pour réparer une hernie crurale simple; 91 furent effectuées pour réparer une hernie crurale qui était apparue après une première herniorraphie pour hernie inguinale homolatérale ou une hernie crurale antérieure, soit dans cet hôpital, soit ailleurs.

La technique principale était subinguinale. L'article en décrit quatre modifications, une complètement subinguinale et trois comportant une exploration de canal inguinal.

La proportion de récidives pour la hernie crurale simple chez la femme a été de 1.3% et pour la hernie fémorale "récidivante" chez la femme de 5.5%.

FEMORAL hernia in the female is relatively uncommon. In a 21-year period at the Johns Hopkins Hospital from 1925 to 1946 a total of 93 females underwent operation for repair of femoral hernia out of a total of 316,525 patients admitted, representing a ratio of one in 3400 hospital admissions.[1] In a 20-year period at the Henry Ford Hospital from 1916 to 1936 a total of 36 females underwent operation for repair of femoral hernia out of a total of 241,037 admissions, a ratio of one in 6700 admissions.[2] Because of this relative rarity and because it seemed likely therefore that few surgeons had an extensive personal experience with the condition, I decided to review and report our experience with it at the Shouldice Hospital, Toronto, where a large number of hernia repairs in both sexes have been performed.

In the 19-year period between January 1, 1945 and January 1, 1964, 373 female patients underwent 384 femoral hernia repairs at 384 operative sessions. During this period 2325 abdominal herniorrhaphies were performed upon 1912 female patients at 2127 operative sessions and about 40,000 inguinal hernia repairs were performed on males.

INCIDENCE

Of the 2325 abdominal hernias repaired in females 1243 were inguinal,[3] 384 femoral, 353 incisional, 284 umbilical, 45 epigastric and 16 miscellaneous (Table I). Thus in this series inguinal hernias were three times as common as femoral hernias in the female. During the same period inguinal hernias were 50 times as common as femoral hernias in the male.

Of these 384 femoral repairs, 293 were performed for simple femoral hernia, 84 for femoral hernia which had appeared after an operation on the same side performed previously in some other hospital for repair of inguinal or femoral hernia, and seven were for femoral hernia which had occurred after an operation on the same side performed previously in this hospital for repair of inguinal or femoral hernia (Table II). Thirty-one repairs were performed for obstructed or strangulated hernia. This paper deals largely with the unobstructed case in which surgery was elective.

TABLE I.—INCIDENCE OF ABDOMINAL HERNIAS IN FEMALES

Type	*Number*	*Percentage of total*
Inguinal	1243	53
Femoral	384	17
Incisional	353	15
Umbilical	284	12
Epigastric	45	2
Miscellaneous	16	1
Total	2325	100

*From the Department of Surgery, Shouldice Hospital, Toronto.

TABLE II.—TYPE OF FEMORAL HERNIA ENCOUNTERED IN FEMALE PATIENTS

Type of femoral hernia	*Number of cases*	*Percentage*
Simple	293	76
Following initial repair elsewhere	84	22
Following initial repair in this hospital	7	2
Total	384	100

The youngest female patient was 13 years, although the hernia had been present since infancy. The incidence of femoral to inguinal hernia in children is variously reported but is of the order of one to four per 1000 in most large series. There is much difference of opinion regarding the sex incidence of femoral hernias in children. In 760 herniorrhaphies performed in this hospital on children below the age of 10 years during the period reviewed, only one case of femoral hernia, in a boy of 5 years, was encountered. Of the three teenage girls operated upon one gave a history of hernia since infancy and in one the hernia had been present since early childhood. In Lloyd's[5] series of 715 cases of both sexes from Great Ormond St., London, one femoral hernia was encountered. However, in Fergusson's[6] series there were eight female children below the age of 10 out of a total of 347 females and five male children below the age of 10 out of a total of 153 males with femoral hernias. Nevertheless, because of its rarity, no surgeon has much experience with this condition in childhood and most have not seen a case.[7] The oldest patient in this series was 89.

DEFINITION

In this series a femoral hernia was defined as a hernia seen at operation to be protruding through an orifice of exit in the femoral sheath.[8] It was usually but not always diagnosed clinically. It nearly always consisted of a peritoneal sac which was usually covered with extraperitoneal fat. Much less often it was entirely fatty. Very small fatty femoral protrusions or fat tabs are commonly encountered in the male but they are much less common in the female and are not included within the definition given. In three cases a different problem in definition occurred. In each the femoral region was intact when examined from below the inguinal ligament. Examination from above, however, from within the femoral canal after the inguinal canal had been opened, revealed a true peritoneal sac lying completely within the femoral canal. These sacs were dealt with routinely but, in accordance with the definition above, were not classified as femoral hernias.

DIAGNOSIS

The clinical characteristics of a femoral hernia are well known and the diagnosis is usually easy. Nevertheless, it was misdiagnosed as an inguinal hernia in 8% of the cases in this series. The inguinal region was always examined clinically even in the presence of an obvious femoral hernia. The type of surgical procedure subsequently used was variable and occasionally depended upon this clinical observation.

ANESTHESIA AND FOLLOW-UP DATA

These have been described elsewhere.[3] In adults regional infiltration anesthesia preceded by adequate preoperative sedation was used. Children had general anesthesia. In adults bilateral operations were staged two days apart. A comprehensive follow-up lasting a minimum of 10 years for each patient was in operation and was considered of great importance. It enabled the great majority of patients to be examined or contacted annually during this postoperative period. Moreover, it was thought probable that the remaining undocumented cases represented successful repairs rather than unsuccessful ones in view of the care taken with the follow-up system. A relatively accurate statistical analysis of the long-term results obtained was therefore possible.

Seven different surgeons using the same general techniques performed the great majority of these operations on females with femoral hernia. Eighty-five were performed personally.

TECHNIQUE

An oblique inguinal incision was used. The femoral region was entered immediately below the inguinal ligament by incising the deep fascia of the thigh about 1 cm. below and parallel with the medial part of the ligament. At this level the falciform edge of the saphenous opening and the saphenous vein lying distally were rarely seen. The hernia was usually obvious as a diffuse vague swelling beneath the fascia even before this had been incised. Sometimes, however, it was difficult to find and careful search was always made. It was typically covered by a layer of extraperitoneal fat which was separately excised. Freeing the hernia usually demonstrated a relatively narrow neck. Accurate freeing around the neck was considered important. In most cases this revealed the orifice of exit as a small oblique opening on the medial wall of the femoral sheath measuring 0.5 to 1.0 cm. in its long axis. This opening had a firm edge and was sometimes almost under the overlying inguinal ligament. Occasionally it was much larger, destroying most or all of the medial wall of the femoral canal. In a few cases it came through the anterior part of the sheath as a rare prevascular femoral hernia. Its upper medial margin was usually closely related to the free edge of the undersurface of Gimbernat's ligament.[8] Omentum was the structure most commonly found within the sac, being present in 25% of cases, and frequently adherent to the sac. These adhesions were freed and the sac was excised from below in the great majority of cases. The ligated stump retracted out of sight into the inguinal region or was usually easily reduced upwards by gentle pressure or further freeing.

At this stage of the operation a decision to open the inguinal region or to leave it intact had to be made. Several advantages resulted from opening it. An in-

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guinal hernia found clinically or suspected at operation could be dealt with. An obstructed or strangulated hernia was sometimes better treated from above. Mobilization of an adherent femoral stump was sometimes only possible after opening the inguinal region. A closure of the femoral ring could be carried out under direct vision. The disadvantages were that quite often, in retrospect, it was unnecessary. The posterior wall of the inguinal canal in the female is typically a strong structure[3] and the incidence of direct inguinal hernia in females is low. Hence an accurate clinical assessment of the inguinal region should always be made even when an obvious femoral hernia is present. In a poor-risk patient the shorter time needed to perform the easier subinguinal repair could be a deciding factor. There is also the added risk of inguinal recurrence if the inguinal region is opened.

The basic repair used in this hospital was a closure of the orifice of exit performed from below the inguinal ligament. Each repair, however, fell into one of four modifications of this basic repair. These four subtypes (Types 1-4) are classified as follows:

		Number of operations performed	*% of total*
(a) External oblique not opened..	Type 1	151	39
(b) External oblique opened.....		233	61
(α) posterior wall of inguinal canal examined but not opened, repair below only;	Type 2	24	6
(β) posterior wall of inguinal canal opened.....		209	55
(i) repair performed from below only.....	Type 3	162	43
(ii) repair performed from above and below inguinal ligament.....	Type 4	47	12

In 39% of cases (Type 1) the orifice was closed entirely from below using two lines of No. 34 stainless steel wire sutures. The first line carried the lower edge upwards deep to the upper to fasten it high on the pectineus, or on the pectineal line, or directly to Cooper's ligament if that structure could be reached. The medial part of this continuous suture line picked up Gimbernat's ligament. It was usually impossible technically to avoid including the undersurface of Poupart's ligament with the medial part of this suture line. The second line of continuous sutures brought the upper free edge of the orifice downwards and medially over the first. This repair strengthened the whole medial aspect of the femoral canal and diminished its size. Sometimes the remaining dead space between the medial aspect of the femoral sheath and the pectineus was separately closed.

In 61% of cases the inguinal canal was opened for the reasons indicated. In 6% (Type 2) the external oblique was closed without opening the posterior wall of the inguinal canal because it was strong and because no indications for its division were present. In 43% (Type 3) the posterior wall was opened and a femoral repair then performed entirely from below the inguinal ligament. This method allowed the orifice of exit to be demonstrated by a finger inserted from above the inguinal ligament through the femoral ring into the femoral canal, as well as affording protection to the femoral vessels during the repair. In 12% (Type 4) the femoral ring was judged large and the femoral canal wide enough to justify an additional closure of the femoral ring from above as well as the routine closing from below. In a few cases these two separate closures were combined into a simultaneous synchronous above-and-below technique. The femoral ring was closed or narrowed by attaching Cooper's ligament to the transversalis fascia or to the back of Poupart's ligament where the transversalis passed downwards behind it, using a continuous No. 34 stainless steel suture line. In Types 3 and 4 a routine inguinal repair was then performed.

SIMPLE FEMORAL REPAIRS—293 CASES

Two hundred and ninety-three femoral repairs were performed upon 288 female patients, since in 10 (3%) the hernia was bilateral. Bilateral femoral hernia is uncommon in both sexes. Two hundred and nine cases were on the right side and 84 on the left.

TABLE III.—SIMPLE FEMORAL REPAIRS IN FEMALE PATIENTS

	Number	*Percentage*
Total.....	293	100
Right side.....	209	72
Left side.....	84	29
Bilateral.....	10	3
Peritoneal sac present.....	275	95
Entirely fat.....	18	5
Recurred later as femoral.....	4	1.3

In 18 of these cases the hernia was entirely fatty (Table III). In 15 of the 18 there was also an associated inguinal hernia, which was the only hernia diagnosed clinically. Therefore a fatty femoral hernia was clinically diagnosed on only three occasions, in each of which it was unaccompanied by an inguinal hernia, and was never clinically diagnosed on the 15 occasions on which it was. If a femoral hernia in a female is clinically diagnosed, it is almost certain to contain a true sac.

In the remaining 275 cases the femoral hernia consisted of a peritoneal sac. In 33 of these there was an associated ipsilateral inguinal hernia. These 33 cases form a complicated group. In eight of the cases a clinical diagnosis of inguinal hernia was made, and in five a clinical diagnosis of both inguinal and femoral hernia was made, i.e. in 13 of the 33 cases an inguinal hernia was diagnosed clinically and in the remaining 20 it was discovered at operation. At operation the inguinal hernia was found to consist of a true sac in 14 cases and was entirely fatty in 19 (Table IV). In five it was described as very small. In only two cases was a direct inguinal hernia encountered, each described as a tiny fatty hernia. Direct inguinal hernia in the female is rare and the association of femoral hernia with direct inguinal hernia particularly rare. Of the 14 cases consisting of a true indirect sac and associated with a femoral hernia the clinical diagnosis of inguinal hernia was correctly made in nine, in five of which the femoral hernia was also diagnosed and in four of which the femoral hernia was itself only discovered at operation. In only five cases therefore was

TABLE IV.—FEMALE PATIENTS WITH A DIAGNOSED SIMPLE FEMORAL AND AN ASSOCIATED IPSILATERAL INGUINAL HERNIA

Total	33
Inguinal hernia diagnosed preoperatively	13
Inguinal hernia undiagnosed preoperatively	20
Inguinal hernia indirect	31
Inguinal hernia direct	2
Inguinal hernia containing peritoneal sac	14
Inguinal hernia entirely fat	19

a true indirect inguinal sac not diagnosed clinically, and in two of these it was described as small when discovered at operation. These figures suggest that the risk involved in missing an inguinal hernia by not exploring the inguinal region in a female patient who has a femoral hernia and in whom no clinical evidence of an inguinal hernia is present is of the order of 1 to 2%. This may be important when a surgeon is considering whether to perform a repair of a femoral hernia entirely from below the inguinal ligament or not.

Of 1243 repairs performed in female patients with inguinal hernia, a femoral hernia with a peritoneal sac, undiagnosed clinically, was found in four instances, and in 15 an unsuspected fatty femoral hernia was found. If the femoral region had not been routinely explored, these 19 cases might subsequently have represented a 1 to 2% "recurrence" rate of femoral hernia following inguinal herniorrhaphy in female patients.

There were three cases of prevascular femoral hernia in which the hernia protruded through the femoral sheath anterior to the femoral vessels. In two other cases the hernia involved the anteromedial part of the sheath.

In general, therefore, in contradistinction to the male, in whom the association of multiple hernia types on one side is relatively common, the female tends to have a solitary hernia, either indirect inguinal or femoral in type. A direct inguinal hernia is uncommon and particularly uncommon in association with another hernia on the same side. This lends justification on the one hand to surgical treatment directed only towards the cure of the indirect inguinal hernia, with less emphasis in a female on the repair of the posterior wall of the inguinal canal than in a male; and on the other, to the treatment of a femoral hernia in a female patient entirely from below the inguinal ligament.

It may be opportune to speculate at this point that the reason females develop femoral hernia proportionately more frequently than males is because in females the inguinal region is stronger. Indirect inguinal hernia in the female is usually small, and sliding inguinal hernia and direct inguinal hernia are both rare. It is probable that the femoral region is also stronger in the female and that the small weak area in the medial wall of the femoral canal gives way reluctantly with a greater risk of obstruction or strangulation because of the firm edges of the orifice of exit.

The average age at operation was 52 years. The youngest patient was 13 years old and the oldest 89 years. Three patients were between 10 and 20 years, 13 between 20 and 30 years, 57 between 30 and 40 years, 75 between 40 and 50 years, 46 between 50 and 60 years, 62 between 60 and 70 years (Table V), 28 between 70 and 80 years and nine were more than 80 years old, i.e. 82% were aged between 30 and 70 years. In 117 (40%) the hernia was partially or totally irreducible. Two-thirds of the patients weighed less than 130 lb. and one-quarter less than 115 lb. Antibiotics were used in 15 cases (5%). There were three cases of postoperative wound infection, a rate of 1%.

TABLE V.—AGE INCIDENCE IN FEMALE PATIENTS WITH SIMPLE FEMORAL HERNIA

Age	*Number*	*Percentage*
0 - 10	0	0
11 - 20	3	1
21 - 30	13	4
31 - 40	57	19
41 - 50	75	26
51 - 60	46	16
61 - 70	62	21
71 - 80	28	10
81 - 90	9	3
	293	100

Four recurrences, a recurrence rate of 1.3%, are known. These patients were aged 42, 62, 71 and 77 years at the first operation. One recurred within four days because a second component had been missed, one recurred in a month and the other two within one year. In one the original operation was for a strangulation. Two have undergone a second operation in this hospital for the repair of the femoral recurrence.

This recurrence rate for femoral herniorrhaphy in females appears to be lower than in most recorded series. In Fergusson's[6] series it was 10% (34 recurrences in 347 female repairs) and in Butters'[9] series it was 6% (four recurrences in 66 female repairs). Birt[10] stated that the recurrence rate for operations for femoral hernia varied from 5 to 10% in various reported series. The low recurrence rate obtained in this series suggests that the low or femoral type of repair modified as described and carefully performed gives good results. Butters,[9] Lytle[8] and Wakeley[11] all preferred the low operation, i.e. closure of the orifice from below the ligament only, although their analyses considered males as well as females.

Femoral Hernia Following Previous Ipsilateral Inguinal or Femoral Herniorrhaphy Performed in Some Other Hospital—84 Cases

These 84 cases presented with a femoral hernia when first seen in this hospital. The initial repair or repairs had been performed elsewhere for an inguinal or a femoral hernia. Since the operation notes were not available, the type of the original hernia was not known. If the time interval between the repair and the appearance of the femoral hernia was very short, it seems likely that a femoral hernia may have been missed originally. A longer interval suggested either a new hernia or

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a hernia developing as the result of a previous inguinal or femoral repair. In 64 cases the hernia had recurred after one operation previously on the affected side, in 15 after two operations, in four after three operations and in one case after four previous repairs. No case of bilateral femoral "recurrence" was encountered in a female.

TABLE VI.—FEMALE PATIENTS ADMITTED WITH FEMORAL HERNIA FOLLOWING REPAIR (INGUINAL OR FEMORAL) ELSEWHERE

Number of previous operations	*Number*	*Percentage of total*
1	64	76
2	15	18
3	4	5
4	1	1
Right side	62	74
Left side	22	26
Bilateral	0	0
Developed further femoral hernia after repair of femoral hernia here	5	6

In 62 cases the hernia was on the right side and in 22 on the left (Table VI). The average age at operation when performed here was 51 years. The youngest patient was 13 years old and the oldest 81 years. In six cases a history of a wound infection was given following a previous repair but no case developed a postoperative wound infection following the repair performed here. Antibiotics were administered in 45% of cases (38 out of 84) but these drugs are prescribed less frequently now than a few years ago.

A Type 1 repair was performed in 31 cases, Type 2 in 14, Type 3 in 26 and a Type 4 repair in 14 (see earlier description of types).

In this group of cases some very difficult repairs were encountered. Considerable experience and familiarity with the area was necessary for a good repair to be accomplished when the hernia was large. In such cases the orifice of exit and the femoral ring had become coincidental and in some of these it was possible to effect a very satisfactory closure entirely from below the inguinal ligament.

Five, i.e. 6%, of these patients are known to have developed a further recurrence. This figure represents our own recurrence rate of "recurrent" femoral hernia in females. All occurred following a single operation elsewhere and then a femoral repair here. The only accurate report of the recurrence rate of true recurrent femoral hernia discovered in the literature was in Wakeley's series.[11] He gave an operative recurrence rate of less than 2% for the low operation for the repair of simple femoral hernia in males and a recurrence rate of more than 60% for the repair of recurrent femoral hernia.

Femoral Hernia, Following Previous Ipsilateral Inguinal or Femoral Herniorrhaphy Performed in this Hospital—10 Cases[4]

Some of these cases have already been discussed but it was thought best to consolidate the group in a single section.

Of these 10 cases, seven have undergone a second operation in this hospital for the repair of the "recurrent" femoral hernia. Four of the 10 cases developed a femoral hernia following a simple femoral herniorrhaphy performed here, and two of these have undergone a further repair. One developed a femoral hernia following a simple inguinal repair performed in this hospital and a further repair has been performed. The remaining five developed a femoral hernia following a repair performed here for a femoral hernia which itself had developed following a simple inguinal or femoral herniorrhaphy performed elsewhere. Four of these five have undergone a second repair here.

In all, therefore, 10 femoral hernias have developed following 1620 repairs performed in this hospital upon female patients admitted with an inguinal (1243 cases) or a femoral (377 cases) hernia.

SUMMARY

A series of 384 consecutive femoral herniorrhaphies in females performed in a 19-year period in one hospital is reviewed.

Two hundred and ninety-three repairs were performed for simple femoral hernia. Eighty-four repairs were performed for femoral hernia which had followed one or more previous repairs on the same side for an inguinal or femoral hernia performed in some other hospital. Seven repairs were performed for femoral hernia which had followed one or more previous repairs on the same side for an inguinal or femoral repair performed in this hospital.

The basic repair was performed below the inguinal ligament.

Four different modifications of this basic repair are described. In Type 1, 151 (39%) of the operations were performed without opening the external oblique. In Types 2, 3 and 4, the external oblique was opened. There were 24 (6%) of Type 2 cases in which the inguinal canal was not opened further, 162 (43%) of Type 3 cases in which the posterior wall of the inguinal canal was divided and the low repair controlled from above and 47 (12%) of Type 4 cases in which the femoral ring was closed from above in addition to the low repair.

The technique in each of the four types is described and the indications are given. The results are discussed and analyzed. The recurrence rate for simple femoral herniorrhaphy in the female was 1.3%.

The results obtained in this series of 384 consecutive femoral repairs in female patients suggest that the low operation modified in the majority of cases by opening the inguinal canal gives good results associated with a low recurrence rate.

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