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Repair of femoral hernias with "plug" technique

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Summary: Femoral hernia is one of the less frequently encountered forms of groin hernia, but nonetheless produces a considerable amount of surgical concern. The repair of femoral hernia utilizing traditional sutured techniques is frequently associated with complications and a significant incidence of recurrence. A series of 24 cases repaired with the meshplug technique is presented with technical details of the operative procedure. All of these operations were performed on an ambulatory basis in an out-of-hospital, government-certified, ambulatory surgical environment. Not a single case of recurrence or other significant complication has been encountered. This retrospective study demonstrates the efficacy and reliability of plug repair of femoral hernia.

Key words: Femoral hernia – Meshplug repair – PerFix plug

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The preferred approach to the repair of the femoral hernia remains an area of controversy to the present date. It is the authors' view that more progress has been made in the last 20 years of hernia surgery than in the preceding 100 years. The major impetus for this evolution has been the advancement of prosthetic-based techniques.

The literature is replete with documentation of high recurrence rates following tissue-based repair of femoral hernia [McClure and Fallis 1939, Koontz 1963, Halverson and McVay 1970, Ponka and Brock 1971] with failure rates from 3.1% to greater than 30%.

A report by Lichtenstein [Lichtenstein and Shore 1974] 24 years ago first detailed the use of a polypropylene meshplug to occlude the femoral defect without significant complication or recurrence. Long-term efficacy, with excellent results over a period of 27 years were described as recently as 1995 [Lichtenstein, Shulman and Amid 1995]. The reduction in postoperative pain and early resumption of physical activity were stressed.

Since 1989, we have used this technique to treat all patients presenting to our private surgical practice for elective repair of both femoral and other types of groin hernia [Robbins and Rutkow 1993, 1996, 1997; Rutkow and Robbins 1993, 1995a]. A retrospective review of this series of femoral hernia repair with the Bard® Mesh, formerly Marlex®, (CR Bard, Murray Hill NJ) PerFix® (CR Bard, Murray Hill NJ) hernia plug (Fig. 1) from July 1993 to June 1997 is presented. Before 1989 we treated femoral hernias with a Cooper ligament repair. We abandoned this technique due to persistent dissatisfaction with pain and prolonged rehabilitation and 2 cases of femoral vein compression.

Surgical techniques

Surgery is accomplished in our private, fully certified, office-based surgical suite [Rutkow and Robbins 1995b]. This is located in a medical office building 2 miles from the nearest hospital.

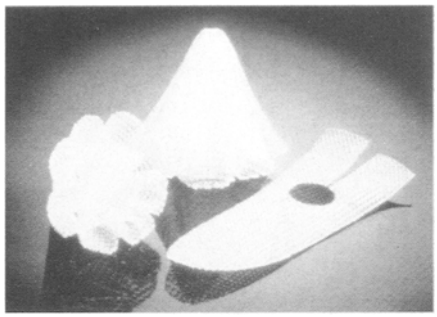

Fig. 1
The PerFix hernia plug

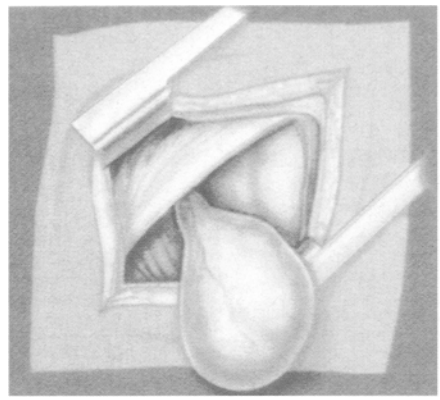

Fig. 2
Computer graphic showing the femoral hernia sac prior to reduction

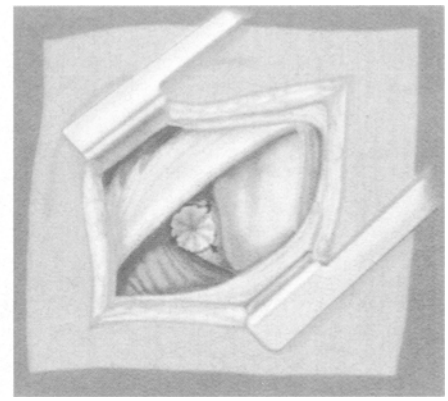

Fig. 3
Computer graphic showing the PerFix plug sutured in place to the fascial margins of the hernia defect (inguinal ligament anteriorly, lacunar ligament medially, pectineal fascia posteriorly, femoral sheath laterally)

In healthy patients under the age of 40, no laboratory tests are obtained. A CBC, chemistries, and chest x-ray are requested depending on medical necessity. Routine coagulation studies are avoided. Electrocardiogram is performed over the age of 40. Lower GI endoscopy is obtained only when suggested by history. Medical consultation is requested when indicated.

Oral intake is stopped the night before surgery, except for significant medication, which is taken the morning of surgery with a small amount of water. No preoperative showers or skin preparation is ordered. Enemas and laxatives are not utilized.

A limited shave is performed by the surgeon in the operating room. The skin is treated with povidone-iodine and alcohol. All procedures are performed with an assistant surgeon. Perioperative systemic and topical antibiotics are not used.

Epidural anesthesia is most commonly utilized. The agent consists of 3% chloroprocaine to which a small amount of sublimaze is added. Intravenous sedation is utilized as needed.

The transverse skin incision is 3-4 cm in length and is located directly over the hernia impulse. All dissection is performed with electrocautery. Average blood loss is less than 5 ml.

Dissection is carried down to the hernia sac which is usually poorly reducible and located subcutaneously. Staying close to the plane of the sac, it is dissected down to its base at the orifice of the femoral canal (Fig. 2). The sac is then reduced or may be ligated and excised. A helpful maneuver may be to make a 1-2 mm incision in the lacunar ligament to facilitate reduction. The inguinal ligament should never be incised.

A PerFix hernia plug is placed in the femoral canal, narrow end first, so that the outer circumference lies flush with the femoral orifice (Fig. 3). It is then sutured in place to the fascial margins of the defect, with 3 or 4 interrupted sutures of polyglactin 910. An onlay patch is not utilized. This is followed by routine wound closure. The typical operative procedure takes 15 minutes to complete.

Patients are discharged 2 hours after completion of surgery. They are instructed to resume normal daily activities by the following morning, including showering and driving. There is never a restriction on heavy lifting or exercise beyond 2 weeks. No postoperative narcotics are utilized for analgesia. The majority of patients take no pain medication, and either acetaminophen or ibuprofen is utilized by the minority. The initial postoperative visit is 1 week after surgery, with additional visits as necessary, and then annually.

The PerFix plug is made from Bard mesh which is a monofilament polypropylene prosthesis. It consists of a pleated outer shell combined with an internal arrangement of 8 triangular petals to maintain the conical shape of the plug and to aid in filling the hernial defect. The flexibility of this plug gives it the inherent ability to conform to the size and shape of virtually all groin defects. The degree of thickness of the plug may be readily customized by removing all or a portion of the internal petals readily with a scissor. In the case of the typical femoral hernia with a diameter of less than 10 mm the most commonly utilized plug is the medium size with all of the petals removed.

Material and methods

From July, 1993 to June, 1997 a total of 24 patients underwent femoral herniorrhaphy with PerFix plug repair. No other hernia repair method was performed during this time interval. Thus, the repair proved to be amenable to the repair of every femoral hernia which presented itself to this service. Sixteen patients had primary femoral hernia, 8 had femoral recurrence following repair of previous groin hernia (Table 1). No cases of bilateral femoral hernia were encountered. Four (25%) of the patients with primary femoral hernia had a history of bronchial asthma. Of the 8 cases of recurrent hernia, none had previous prosthetic repair

Table 1. Characteristics of 24 cases of femoral hernia repaired with the PerFix plug (7/93-6/97)

	Primary (n=16)	Recurrent (n=8)
Male	2	4
Female	14	4
Left	6	3
Right	10	5

nor were our own recurrences. Two were specifically identified as having previous Shouldice repairs. A total of 1302 primary groin hernias were repaired in the same time interval, with primary femoral hernias consisting of 1.2% of all primary groin hernias encountered.

Results

Patients were followed from 6 months to 54 months, with a mean of 30 months, by personal examination by the operating surgeon. Follow-up was 92% at 1 year, 75% at 2 years, and 73% at 3 years.

There was a predominance of female patients in the primary hernia series, but not in the recurrent femoral hernia cases. In the recurrent femoral hernia series, the previous operation ranged from 14 to 26 years prior to the secondary operation. None of the recurrences treated in this series followed prosthetic-based repairs.

No patients were readmitted to hospital or failed to be discharged on the day of surgery. There no recurrences or other significant complications, including thrombo-embolus, urinary retention, infection of mesh, and long-term pain. No plugs were removed and no sinus tracts encountered. There was no clinical evidence of any infectious process involving a plug or of sepsis.

Discussion

It should be emphasized that this series consists of femoral hernia repairs, both primary and recurrent, that were elective in nature. Although a high percentage of these hernias were non-reducible, there were no acute emergency cases during this period of time.

In those patients with recurrent femoral hernias following sutured, tensioned repairs, the long-time interval to recurrence points to continued tissue degeneration coupled with suture-line and tissue tension as the major factors in eventual failure of the previous repair. Our experience in the treatment of inguinal hernias with meshplug techniques has demonstrated the diminution of long-term recurrence [Rutkow and Robbins 1997]. In that series of 3,012 patients with follow-up of 1 month to 8 years (mean of 4 years), no recurrences were seen beyond the third postoperative year.

The lack of recurrence following this repair is remarkable, as is the absence of other significant complications. Other methods of repair, whether by the inguinal approach, or the properitoneal approach, open or endoscopic, share the common disadvantages of tension on the suture line and\or complexity. Certainly, the sutured approximation of inguinal ligament to Cooper's ligament or pectineal ligament creates not only unnatural tension, but the likelihood of femoral vein compression. Suture-line tension remains the leading cause of recurrence, pain and disability.

It is significant that there were no cases of synchronous femoral hernia with indirect or direct inguinal hernia in this series, as evidenced by the absence of recurrent or persistent indirect or direct hernia following repair of femoral hernia. Not surprisingly, there were no recurrent or persistent femoral hernias following repair of indirect or direct hernias in the (previously reported) inguinal hernia series [Robbins and Rutkow 1993, 1996, 1997; Rutkow and Robbins 1993, 1995a]. It, therefore, does not appear to be necessary to open the inguinal canal when performing femoral hernia repair.

The hallmarks of this operation are simplicity, decreased dissection, and diminished complications, resulting in reduced patient discomfort and rapid rehabilitation.

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