

# Unsuspected femoral hernias diagnosed during endoscopic inguinal hernia repair

Jacek Białecki<sup>1,A–D</sup>, Przemysław Pyda<sup>1,2,B,D–E</sup>, Ryszard Antkowiak<sup>3,E,F</sup>, Paweł Domosławski<sup>4,E,F</sup>

<sup>1</sup> Department of General, Minimally Invasive and Trauma Surgery, Franciszek Raszeja Municipal Hospital, Poznań, Poland

<sup>2</sup> Department of General and Endocrine Surgery and Gastroenterological Oncology, Poznań University of Medical Sciences, Poland

<sup>3</sup> Department of General and Multiorgan Surgery, 3<sup>rd</sup> Provincial Hospital, Rybnik, Poland

<sup>4</sup> Lower Silesian General Surgery Consultant, Department of General, Gastroenterologic and Endocrine Surgery, Wrocław Medical University, Poland

A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation;

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## Address for correspondence

Ryszard Antkowiak

E-mail: ryszardantkowiak@wp.pl

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## Abstract

**Background.** The laparoscopic totally extraperitoneal inguinal hernia repair (TEP), unlike the Lichtenstein tension-free mesh repair, allows for inspecting the femoral canal area for the presence of an occult femoral hernia.

**Objectives.** To determine the incidence of an unsuspected femoral hernia in patients undergoing TEP repair.

**Materials and methods.** Data was collected prospectively from 180 patients (23 women) who underwent hernia repair, including examination of the femoral canal, between November 2017 and March 2019, and the incidence of a femoral hernia was determined. Correlations between the incidence of a femoral hernia and sex, age and the type of inguinal hernia diagnosed in the patients (indirect, direct, both indirect and direct) were assessed.

**Results.** Femoral hernias were found in 14 patients (7.77%). None of the hernias had previously been detected clinically. The incidence of a femoral hernia was higher in women (6/23, 26.07%) than in men (8/157, 5.09%). The incidence of a femoral hernia was higher in older patients: the average age of patients with a femoral hernia was 57.86 years (median: 60 years), whereas the average age of patients without a femoral hernia was 49.92 years (median: 49 years). However, the correlation was not statistically significant. No correlation was found between the incidence of a femoral hernia and the type of inguinal hernia diagnosed in the patients (direct, indirect, both indirect and direct).

**Conclusions.** The TEP repair allows for detecting and repairing an occult femoral hernia.

**Key words:** unsuspected femoral hernia, occult hernia, laparoscopic totally extraperitoneal inguinal hernia repair

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## Background

The Lichtenstein tension-free mesh repair and the laparoscopic totally extraperitoneal inguinal hernia repair (TEP) are the 2 most common methods of inguinal hernia repair. Each method has advantages over the other.<sup>1–3</sup> The Lichtenstein method does not require general anesthesia and is associated with a shorter operating time compared with the TEP method of repair; it also involves a lower risk of complications and recurrence. The main advantages of the TEP method over the Lichtenstein method include better cosmetic results, a faster return to usual activities and a lower risk of chronic postoperative pain. One other advantage of the TEP method is that it allows for inspecting the femoral canal area for the presence of an occult femoral hernia. Routine inspection of the femoral canal is particularly crucial given the low clinical and sonographic detection rate of femoral hernias.<sup>4,5</sup> To inspect the femoral canal area, the preperitoneal space needs to be dissected in the area of iliac vessels. If an unsuspected femoral hernia is found, it can be reduced, and the femoral canal can be secured with the same mesh that is used for inguinal hernia repair in the patient concerned.

## Objectives

The purpose of the study was to determine the incidence of femoral hernias found during TEP repair, with a particular focus on the femoral canal examination. One additional objective of the study was to verify to what extent age and sex are risk factors for a femoral hernia and to examine the correlation between the incidence of a femoral hernia and the type of an inguinal hernia diagnosed in the patients (indirect, direct, both indirect and direct).

## Materials and methods

Data was collected prospectively from 180 patients (23 women) who underwent TEP hernia repair, including examination of the femoral canal, between November 2017 and March 2019, and the incidence of a femoral hernia was determined. We used the following definition of ‘femoral hernia’ (after Old et al.)<sup>6</sup>: “[Femoral hernia is] any tissue protruding through a well-defined myofascial defect”. Correlations between the incidence of a femoral hernia and sex, age and the type of inguinal hernia diagnosed in the patients (indirect, direct, both indirect and direct) were assessed. To determine the relationships between variables in a nominal scale, the phi correlation coefficient ( $\Phi$ ) was calculated. The relationship between the ‘age’ variable (interval scale) and the ‘femoral hernia’ variable (nominal scale) was determined using the point-biserial correlation coefficient. The statistical significance of the calculated correlation coefficients was examined – a level of significance of 0.05 was used. All the patients had given their signed consent for the procedure.

As this is a standard procedure performed at our Center, no consent was sought from the relevant ethics committee.

## Surgical procedure

During standard TEP repair, once the inguinal hernia was reduced, the surgeon dissected the preperitoneal space in the area of iliac vessels. Once the area was visualized, the surgeon assessed whether the femoral canal was closed or whether there was a femoral hernia emerging through it. If a femoral hernia was detected, the hernia sac was reduced from the femoral canal. In such a case, the mesh intended to prevent the inguinal hernia from recurring was shaped and positioned in such a way as also to secure the femoral canal. Small fat tissue fragments protruding through the femoral canal were not regarded as a hernia. The content of the femoral canal was reduced only if the tissue appeared to be connected with the peritoneum when pulled towards the bladder and the peritoneum with an instrument. Once the tissue was reduced, it was confirmed whether it was preperitoneal fat or a hernia. In other cases, where the tissue filling the femoral canal was not connected with the peritoneum or preperitoneal fat, it was not removed from the opening.

## Results

A total of 182 patients underwent TEP repair. Two patients were excluded from the study due to conversion

Table 1. Characteristics of the study group

Variable	Value	%
Patients, n	182	–
Conversion to Lichtenstein repair, n	2	1.1
Patients included in the study, n	180	–
Average age [years]	50.53	–
Men, n	157	87.2
Women, n	23	12.8
Patients diagnosed with a femoral hernia, n	14	7.77
The average age of patients with a femoral hernia [years]	57.86	–
The average age of patients without a femoral hernia [years]	49.92	–
Men diagnosed with a femoral hernia, n	8	5.1
Women diagnosed with a femoral hernia, n	6	26.1
Indirect inguinal hernias (diagnosed with a femoral hernia), n	119 (9)	66.1 (5.0)
Direct inguinal hernias (diagnosed with a femoral hernia), n	38 (4)	21.1 (2.2)
Indirect and direct inguinal hernias (diagnosed with a femoral hernia), n	23 (1)	12.8 (0.5)
Recurrent hernias, n	15	8.3
Patients with recurrent hernias (diagnosed with a femoral hernia), n	0	0
Complications, n	0	0

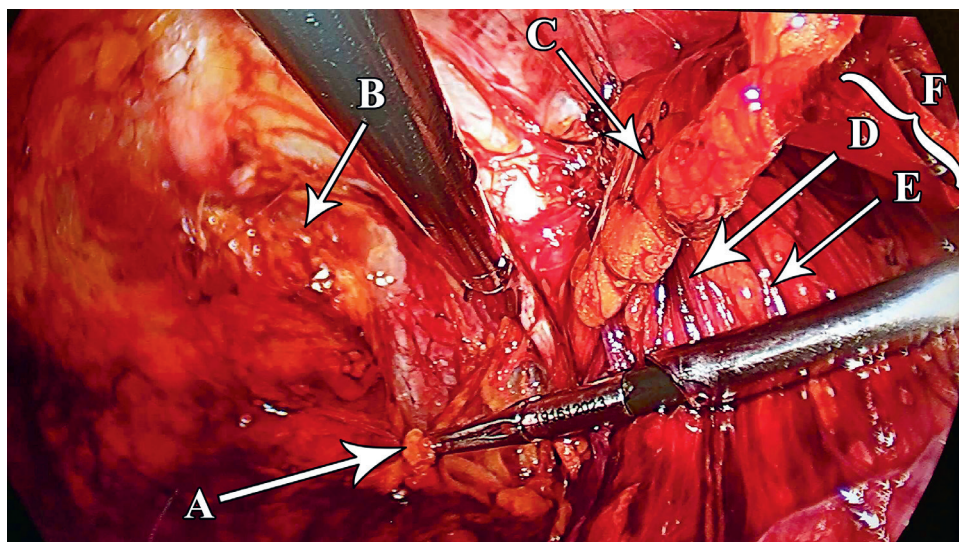


Fig. 1. Right femoral hernia

A – right femoral hernia; B – pubic bone; C – epigastric vessels; D – deferent duct; E – testicular vessels.

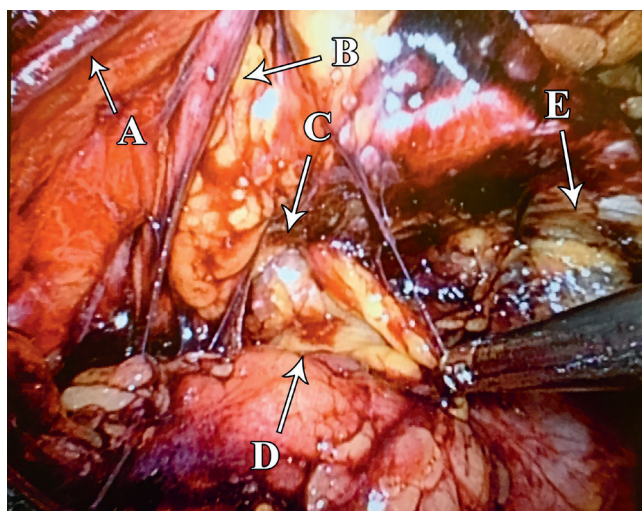


Fig. 2. Left femoral hernia

A – testicular vessels; B – deferent duct; C – femoral ring; D – left femoral hernia; E – pubic bone.

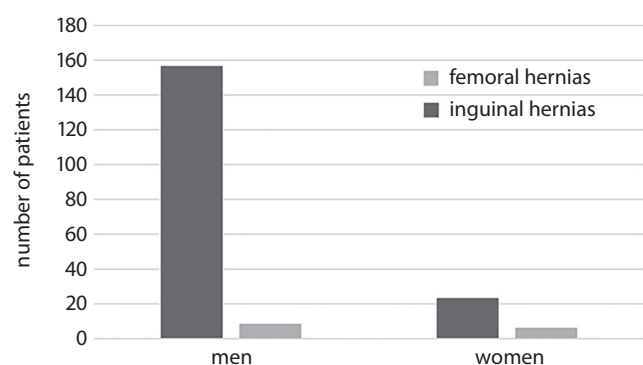


Fig. 3. Unsuspected femoral hernias in men and women

to Lichtenstein repair. Thus, 180 patients were included in the study (23 women). Detailed results are shown in Table 1.

Femoral hernias were found in 14 patients (7.77%) (Fig. 1,2). None of the hernias had previously been detected

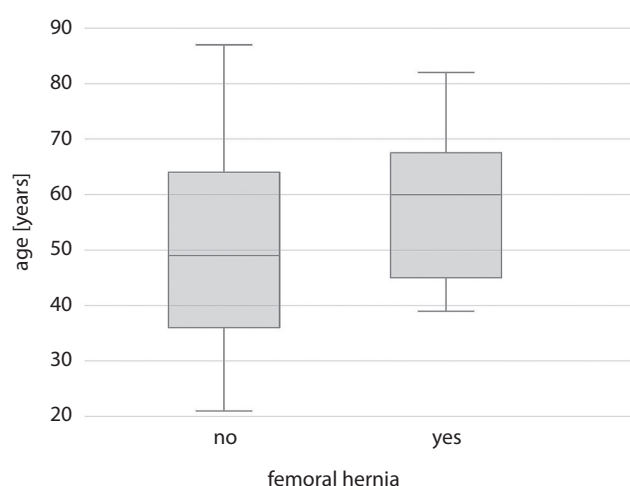


Fig. 4. The incidence of unsuspected femoral hernias and age

clinically. The incidence of femoral hernias was higher in women (6/23, 26.07%) than in men (8/157, 5.09%). The difference was statistically significant ( $\Phi$  coefficient =  $-0.26$ ;  $p = 0.003$ ) (Fig. 3).

The incidence of femoral hernia was higher in older patients: the average age of patients with a femoral hernia was 57.86 years (median: 60 years), whereas the average age of patients without a femoral hernia was 49.92 years (median: 49 years). However, the correlation was not statistically significant (point-biserial correlation coefficient =  $0.14$ ,  $p = 0.064$ ) (Fig. 4).

No correlation was found between the incidence of a femoral hernia and the type of inguinal hernia diagnosed in the patients (direct, indirect, both indirect and direct).

## Discussion

The TEP procedure for inguinal hernia repair offers a unique possibility to inspect the femoral canal area for the presence of an occult femoral hernia. It is all the more



important as the symptoms of a femoral hernia are often scarce, and thus difficult to detect (both clinically and sonographically).<sup>4,5</sup> Different studies give various incidence rates of a femoral hernia. The incidence reported by Putnis et al.,<sup>7</sup> Dulucq et al. and Old et al. was 3.7% (19 of 484 patients),<sup>7</sup> 5.6% (19 of 337 patients)<sup>4</sup> and 2.3% (32 of 1404 patients),<sup>6</sup> respectively. In a study by Henriksen et al., the incidence of a femoral hernia in patients with a recurrent hernia was 9.2%, whereas in patients diagnosed with a bilateral inguinal hernia it was 3.8%.<sup>8</sup> In turn, Waltz et al.<sup>9</sup> demonstrated that in a group of 250 men undergoing inguinal hernia repair, including bilateral exploration of the femoral canal area, the incidence of a femoral hernia was 13%. In our study, the incidence of a femoral hernia was significantly higher in women (26.07%) than in men (5.09%). Such a discrepancy was also observed by Putnis et al., who reported a femoral hernia in 37% of female patients and 3% of male patients.<sup>7</sup> This is also consistent with more general data, which indicates that a femoral hernia is much more common in women.<sup>10,11</sup> Therefore, one of the possible reasons for the discrepancy between the results of our study and those obtained by other authors may be the fact that the patient groups analyzed had different proportions of male and female participants (e.g., in the study by Putnis et al.,<sup>7</sup> 95% of the patients studied were men and 5% were women, whereas in our study, the percentage was 87% and 13%, respectively). The high incidence rate of a femoral hernia provides an additional argument for choosing the TEP method of repair over the Lichtenstein method, especially in high-risk patients, i.e., mainly women,<sup>12</sup> but also in elderly patients. The symptoms of an undetected femoral hernia are also worth considering. Some patients after hernia repair complain about chronic pain.<sup>13</sup> The symptoms are usually interpreted as being associated with the repaired inguinal hernia. Some studies indicate that patients after Lichtenstein repair are more likely to suffer from chronic pain than those undergoing TEP repair.<sup>14,15</sup> One might speculate that in some of these patients, the chronic pain is due to the presence of a small occult femoral hernia. The evaluation of the femoral canal is a safe and fast procedure (it does not result in a significantly longer operating time). Moreover, a femoral hernia detected during TEP inguinal hernia repair may be treated using a different arrangement of the same mesh that is utilized to repair the inguinal hernia in the patient concerned, which minimizes the costs of the procedure.


## Conclusions


One additional advantage of the TEP method of repair in patients surgically treated for an inguinal hernia is that it allows for detecting and repairing an occult femoral


hernia. Given the discrepancies in the incidence of unsuspected femoral hernias found intraoperatively, it would be beneficial to examine the incidence rate of femoral hernias in a larger group of patients.

## ORCID iDs

Jacek Białecki  <https://orcid.org/0000-0002-3486-8698>

Przemysław Pyda  <https://orcid.org/0000-0001-7988-378X>

Ryszard Antkowiak  <https://orcid.org/0000-0003-1377-1608>

Paweł Domosławski  <https://orcid.org/0000-0003-1903-0843>

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