

## The Management of Emergency Groin Hernias in Adults: An Update

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**Abstract:** The management of emergency groin hernias is difficult due to the absence of any consensus and the surgical management is tailored by the treating surgeon. Emergency groin hernias include incarcerated and strangulated inguinal and femoral hernias and they carry a high morbidity and mortality. The treatment of emergency groin hernias is usually performed with sutured repairs like Shouldice, Bassini, Darning and the Desarda technique. Hernia repairs with mesh can also be safely performed if there is no or minimal contamination of the wound. The laparoscopic repairs like the Transabdominal preperitoneal (TAPP) and Total Extraperitoneal (TEP) can be performed but require training and equipment and is not recommended for the management of emergency groin hernia. In this review we will look at the management of emergency groin hernias.

**Keywords:** Emergency Groin Hernia, Strangulated Hernia, Incarcerated Hernia, Mesh Repair, Sutured Repair, Laparoscopy.

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### INTRODUCTION

Emergency groin hernias are complications of both inguinal and femoral hernias, which includes both incarceration and strangulation. Incarceration is defined as groin hernias that become irreducible when they pass through the anterior abdominal wall, and strangulation is defined as the compromising of the blood supply of the contents of the hernial sac which may include omentum or bowel. Emergency groin hernias are seen in 10% to 15% of cases of all groin hernias in adults (Kulacoglu, 2023; Towfigh, 2019). The type of groin hernia is an important factor with femoral hernias being associated with a higher risk of strangulation, followed by inguinal hernias. Other factors that may affect emergency groin hernias are increasing age, presence of co-morbidities like diabetes mellitus, hypertension and patients with an American society of anesthesia (ASA) score of more than 3 (Ahmad *et al.*, 2014.; Álvarez *et al.*, 2004; Özkan *et al.*, 2012).

The World Society of Emergency Surgeons (WSES) in their consensus recommended that for emergency groin hernias, an open hernia repair should be performed with a mesh repair being used for patients

with a clean-contaminated wound. For patients with contaminated or dirty wounds where there is bowel resection, a sutured repair is recommended due to the high risk of infection and sepsis if a mesh is used. Laparoscopic hernia repair is also recommended for incarcerated emergency groin hernias if the expertise is available but not for strangulation or if bowel resection is needed (De Simone *et al.*, 2020). The HerniaSurge guidelines for the management of emergency groin hernias have recommended that for patients with a clean or clean contaminated wound, a repair with mesh is recommended and a large pore polypropylene mesh is recommended. For patients who present with a strangulated groin hernia with contamination, a tailored surgical approach is recommended according to the clinical condition of the patient (Tran, 2018; van Veenendaal *et al.*, 2020).

As there is no consensus on the management of emergency groin hernia repairs, we have conducted this review article to investigate the common types of open hernia repair including the mesh and non-mesh-based repairs, the role of laparoscopic hernia repair in emergency groin hernia repairs and emergency groin hernia repair in the elderly. A literature review was made

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on PubMed, Google Scholar, Semantic Scholar, and Cochrane databases to look for original articles, observational studies, clinical trials, clinical reviews, review articles and meta-analysis from 1990 to 2024. The following keywords were used “mesh repair”, “emergency groin hernia”, “strangulated hernia”, “Incarcerated hernia”, “laparoscopy “and” sutured repair”. All articles were in English language only and further article were obtained by manual cross checking. Case reports, commentaries and editorials were excluded. All articles with adult patients including elderly patients were included in this review. Pediatric patients and pregnant patients were excluded from this review.

## DISCUSSION

### Prosthetic Mesh in Emergency Groin Hernia Repair

The use of polypropylene mesh was initially not encouraged for the surgical management of emergency groin hernias. The presence of contamination of the wound was initially thought to be a contraindication to using a mesh for the hernia repair. Several studies were done that compared the use of polypropylene mesh in the management of incarcerated and strangulated groin hernias, and these studies concluded that the wound infection was comparable with sutured repair and did not require removal of the mesh. Patients with clean and clean-contaminated wounds were associated with better outcomes with mesh repair. Infection rates were higher in the patients with strangulated groin hernias who had undergone bowel resection than those who did not (Abd Ellatif *et al.*, 2012; Duan *et al.*, 2018.; Liu *et al.*, 2019; Ozbagriacik, 2015; Tomaoglu & Okmen, 2021; Topcu *et al.*, 2013).

A systemic review and meta-analysis looking at the effectiveness and safety of mesh repair for incarcerated and strangulated hernias was conducted by Lin *et al.*, 8 studies which included 2 randomized control trials and 6 prospective studies totaling 978 patients were

included in this study. There was no difference between the surgical site infection rate and the recurrence rate was lower in the mesh group when compared to the sutured repair group. This study concluded that mesh repair was feasible in the management of emergency groin hernias (Lin *et al.*, 2020). Another systemic review and meta-analysis was conducted by Hentati *et al.*, comparing mesh versus non-mesh repair for strangulated inguinal hernias. 9 studies with 503 patients were included in this study and the wound infection rates and recurrences rates were lower in the mesh repair group. This study also concluded that mesh-based repair was feasible for emergency groin hernia repair (Hentati *et al.*, 2014). A systemic review and meta-analysis assessing the safety of mesh repair in strangulated groin hernias was conducted by Ekwesianya *et al.*, Seven studies with 1159 patients were included in this study and there was no difference with regards to the wound infection rates and recurrence rates for those patients who underwent mesh repair (Ekwesianya *et al.*, 2024).

The Lichtenstein repair is the most popular mesh-based repair, and it is associated with reduced post operative wound infection in the surgical management of emergency groin hernias. The other complications that were encountered include, scrotal hematoma, chest infections and deep vein thrombosis. Bessa *et al.*, followed up these patients for a period of 10 years and the recurrence rate was 0.9% (Bessa *et al.*, 2007, 2015; Wysocki *et al.*, 2006).

A Cochrane review was conducted by Saeter *et al.*, comparing mesh versus non-mesh repair for emergency groin hernia repair. 15 trials with 1241 patients were included in this review, and this study concluded that there was no difference between both procedures with regards to surgical site infection. Mortality and recurrence rate. This review was not able to conclude that mesh repair was better than non-mesh-based repair in the management of emergency groin hernia repair (Saeter *et al.*, 2023).

Study	Year	N=numbers	Mesh repair numbers	Sutured repair numbers	Infection rate in mesh repair (%)	Infection rate in sutured repair (%)
Wysocki <i>et al.</i> ,	2006	77	56	21	3.5%	14%
Bessa <i>et al.</i> ,	2007	50	25	25	0%	0%
Elsebae <i>et al.</i> ,	2008	54	27	27	3.75%	11%
Duan <i>et al.</i> ,	2018	208	104	104	32%	16%

Table showing the wound infection rates between the mesh repair and sutured repair for emergency groin hernias

### Sutured Based Repairs in Emergency Groin Hernia Repairs

There are multiple sutured repair techniques that can be used for emergency groin hernia repair, that include the Bassani repair, the Shouldice repair and the Darning technique. All these techniques involve suturing the posterior wall of the inguinal canal to the inguinal

ligament and though the wound infection rates are low. The recurrence rates are high as these repairs were under tension. The bassini and darning method are easier to perform and are commonly performed. The Shouldice repair is more difficult to perform, and it requires expertise in performing it but it is associated with the lowest recurrence rate if done properly (Boonnithi & Kongkham, 2010; Essawy *et al.*, 2019.; Lorenz *et al.*, 2021).

The Desarda technique is a recent tension free sutured based repair that is used for the repair of groin

hernias. This repair involves using a strip of the external oblique aponeurosis and suturing it to the posterior wall of the inguinal canal under no tension. As this repair is considered as a tension free repair and it does not involve the use of any foreign material like synthetic mesh. A recent systemic review and meta-analysis was conducted by Ndong *et al.*, looking at the suitability of the Desarda technique for emergency inguinal hernia surgery. 5 studies that included 199 patients were included in this study and the surgical site infection and recurrence rates were comparable with other hernia repairs and this study concluded that the Desarda repair is feasible in the management of emergency groin hernias (Ndong *et al.*, 2020).

### Laparoscopic Repair for Emergency Groin Hernias

The laparoscopic approach can be performed for the management of emergency groin hernias, initial exploration of the abdomen to see if there is presence of strangulation or obstructed bowel. If there is no need to perform bowel resection, the hernia repair is usually performed with the transabdominal preperitoneal (TAPP) approach as the hernia repair and mesh insertion can be performed with the same trocars. Another method is to perform the total extraperitoneal (TEP) approach, but this requires placing trocars in a different plane. Both these procedures require training and is an advanced laparoscopic procedure, hence it is not recommended for the emergency management of groin hernias (Chihara *et al.*, 2019; Moreno-Suero *et al.*, 2023; G. P. Yang *et al.*, 2012).

When deciding which laparoscopic procedure that can be done for patients who present with emergency groin hernias, Pré-operative imaging like computerized tomography can be performed to assess for strangulation of bowel, and the need for bowel resection. If there is no need for bowel resection then the transabdominal preperitoneal (TAPP) approach is the most common procedure but the total extraperitoneal (TEP) approach can also be performed. Both procedures have the advantage of placing a mesh to prevent inguinal, femoral and obturator hernias from occurring (Iossa *et al.*, 2024; G. P. C. Yang, 2017).

### Emergency Groin Hernias in the Elderly

Elderly patients who present with emergency groin hernias are associated with a higher risk of strangulation and obstruction which in turn leads to higher morbidity and mortality. The presence of comorbidities like diabetes mellitus, hypertension, heart disease, a high American society of anesthesia (ASA) score are outcomes for mortality (Azari *et al.*, 2015; Ceresoli *et al.*, 2022; Compagna *et al.*, 2013; Kulah *et al.*, 2001). A systemic review was conducted by Piltcher-da-silva *et al.*, looking at the outcomes of emergency groin hernia repair in the elderly. 9 articles with 1037 patients were included in this study, and the morbidity rates ranged from 21.2% to 28.9% and the mortality rate was 1.2% to 6%. Cardiopulmonary disease and High

American society of anesthesia (ASA) score were risk factors for high morbidity and mortality. This study concluded that the risk and benefits of emergency surgery will need to be assessed before deciding on whether the emergency groin hernias need to be performed in the elderly (Piltcher-da-Silva *et al.*, 2023).

### CONCLUSION

As there is no consensus on what is the best repair for emergency groin hernia repair, a tailored approach by the operating surgeon is the current trend in management of this condition. The open repairs are still the most common operation that is performed for emergency groin hernia repairs. For incarcerated and obstructed groin hernias where no bowel resection is done and contamination is minimal, a mesh-based repair like the Lichtenstein repair can be safely performed in these patients. For patients with strangulated hernias where bowel resection is done and there is contamination of the wound, a sutured based repair like the Shouldice, Bassani or Darning method may be performed. The Desarda technique is a new technique for open hernia repair that can also be performed for emergency groin hernias. Laparoscopic hernia repairs like the transabdominal preperitoneal (TAPP) and the total extraperitoneal (TEP) are new techniques but they require training and expertise in the management of obstructed and strangulated groin hernias, and they are available in centers which has expertise to perform these operations.

**Conflict of Interest:** There is no conflict of interest

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