SAR Journal of Surgery

Abbreviated Key Title: *SAR J Surg*
Home page: https://sarpublication.com/journal/sarjs/home
DOI: https://doi.org/10.36346/sarjs.2025.v06i05.001

ISSN 2707-7748 (P)
ISSN 2709-6912 (O)

Review Article

Current Management of Recurrent Inguinal Hernias: Narrative Review Article

Kumar H.R. MBBS, MS[1*]

[1]Associate Professor of Surgery, Taylor's University School of Medicine and Health Science,47500 Selangor, Malaysia

***Corresponding Author:** Kumar H.R.
Associate Professor of Surgery, Taylor's University School of Medicine and Health Science,47500 Selangor, Malaysia

Article History: | Received: 04.07.2025 | Accepted: 02.09.2025 | Published: 04.09.2025 |

Abstract: The management of recurrent inguinal hernia remains an area of concern, with the choice of surgical repair dictated by the primary repair performed. The principle of management is that if an anterior approach is performed, then the recurrence is repaired with a posterior approach, and vice versa. The aim here is to repair the hernia in a clean, adhesion-free anatomical plane. The common approaches include the laparoscopic repairs, like the transabdominal preperitoneal (TAPP) and total extraperitoneal (TEP). The open pre-peritoneal repair can also be performed for recurrent inguinal hernias. In this review, we will investigate the various surgical procedures that are performed for recurrent inguinal hernias and the risk factors for recurrence.

Keywords: Anterior approach, open repairs, posterior approach, preperitoneal approach, recurrence, TAPP, TEP.

INTRODUCTION

Inguinal hernias are a common condition that is seen in the general surgical practice and are predominantly seen in male patients. Inguinal hernia repairs can be divided into open and laparoscopic repairs. The open repairs can be divided into the mesh-based repairs, of which the Lichtenstein repair is the most popular, and the suture-based repairs, like the Shouldice repair and Bassini repairs. The laparoscopic inguinal hernia repairs can be divided into the total extraperitoneal (TEP) and the transabdominal preperitoneal (TAPP) repairs(Antoniou *et al.,* 2014; Bittner & Schwarz, 2012; McBee *et al.,* 2022).

Recurrence of inguinal hernias after repair is a problem in the surgical management of this condition, with the reported recurrence rate varying from 1.1% to 33%. Some of the factors that can lead to recurrence include obesity, smoking, and comorbidities like diabetes mellitus. The method of surgical repair is also a factor, with the tension-free mesh-based repairs being associated with the lowest recurrence rate when compared with the suture-based repairs(Lee *et al.,* 2016). The approach to the management of recurrent inguinal hernias will take into account the type of repair that was performed, be it an anterior approach like the Lichtenstein repair or the posterior approach like the Trans abdominal Preperitoneal (TAPP) or total extraperitoneal (TEP), to approach a clear, virgin plane to perform the surgery(Barrat *et al.,* 2003; McAllister & Blatnik, 2018; Sevonius *et al.,* 2011).

The HerniaSurg guidelines have recommended that a laparoscopic-endoscopic repair, like the Transabdominal preperitoneal (TAPP) or total extraperitoneal (TEP), be performed for a recurrent hernia from a failed anterior approach. For a failed posterior approach, an anterior approach like the Lichtenstein repair should be performed. For patients who have sustained recurrence after both anterior and posterior approaches, the subsequent repair should be performed by an expert hernia surgeon who will decide which type of procedure to perform. A tailored approach is encouraged for the management of recurrent inguinal hernias(Tran, 2018).

The current guidelines recommend a tailored approach to the management of recurrent inguinal hernias depending on the type of surgery that was initially performed. We have conducted this review article to investigate the role of pre-peritoneal repairs,

including the open and laparoscopic procedures that are used for the management of recurrent inguinal hernias. We conducted a literature review using PUBMED, Cochrane database of clinical reviews, and Google Scholar, looking for clinical trials, observational studies, cohort studies, systematic reviews, and meta-analyses from 1995 to 2025. We used the following keywords: "recurrence", "anterior approach", "TAPP", "TEP "," preperitoneal repair "," open repairs", and "posterior approach". All articles were in the English language only. Further articles were obtained by manually cross-referencing the literature. Case reports and studies with fewer than 10 patients and editorials were excluded. Adult male and female patients were included in this study, and pediatric patients were excluded.

DISCUSSION

Risk Factors for recurrence

The risk factors for the development of recurrence after inguinal hernia repair include patient factors like age above 50 years, a family history of inguinal hernia, and a history of smoking, and other factors include the size of the hernia defect, with an increased size of 3cm or more being associated with recurrence. Direct inguinal hernias were associated with a higher risk of recurrence(Jansen *et al.,* 2009; Junge *et al.,* 2006). A systematic review and meta-analysis of observational studies on the patient-related risk factors for recurrence after inguinal hernia repair was conducted by Burcharth *et al.,* A total of 14 studies with 378,824 repairs were performed on 375,620 patients, and female sex, direct inguinal hernias, and smoking were significant risk factors for recurrence of inguinal hernias(Burcharth *et al.,* 2015). The other factors that affect recurrence include the type of surgery that was performed, with laparoscopic repairs being associated with a higher recurrence rate due to the technical difficulty and the long learning curve that is required to master the procedure. The sutured repair techniques are also associated with a higher recurrence rate due to a high proportion of technical failures(Magnusson *et al.,* 2010).

Laparoscopic preperitoneal repairs for recurrent inguinal hernias

Laparoscopic inguinal hernia repairs for recurrent inguinal hernias can be divided into the transabdominal preperitoneal (TAPP) and total extraperitoneal (TEP). Both these procedures have the advantage of gaining access to the hernia via the preperitoneal space and are ideal for the repair of recurrence after a failed anterior or Lichtenstein repair. The laparoscopic repair was associated with reduced postoperative pain and early ambulation(Haggerty *et al.,* 2021). Keidar *et al.,* conducted a long-term follow-up of five years of 130 patients who had undergone laparoscopic inguinal hernia repair for recurrent inguinal hernias. There were no major bowel or vascular injuries, and the most common complication was seroma formation. The recurrence rate after five years was 5.7%(Keidar *et al.,* 2002). Both the Trans abdominal preperitoneal (TAPP) and the total extraperitoneal (TEP) repairs were found to be safe and effective for the management of recurrent inguinal hernias, and they had acceptable recurrence rates after long-term follow-up(Choi *et al.,* 2010.; Garg *et al.,* 2010; Goo *et al.,* 2010; Tazaki *et al.,* 2021; Ung & Au, 2004).

A register-based comparison of the outcomes between the total extra peritoneal (TEP) and the Transabdominal preperitoneal (TAPP) for recurrent inguinal hernia repairs was conducted by Kockerling *et al.,* A total of 2246 patients were included, with 1464 undergoing the TAPP procedure and 782 undergoing the TEP procedure. There were no differences in postoperative complications, recurrence rates, and chronic pain between the procedures. Both procedures were safe and effective for the management of recurrent inguinal hernias(Köckerling *et al.,* 2017).

Comparison between the laparoscopic and open repairs for recurrent inguinal hernias

A prospective randomized trial comparing the Lichtenstein repair with the total extraperitoneal (TEP) in the treatment of recurrent inguinal hernias was conducted by Kouhia *et al.,* A total of 99 patients were included in this study, and the recurrence rate was similar between both groups, and the chronic pain rate was 27.7% in the Lichtenstein group against 8.2% in the TEP group. This study concluded that laparoscopic hernia repair was better than the open repair for recurrent inguinal hernias(Kouhia *et al.,* 2009). Another randomized controlled trial comparing open or laparoscopic mesh repair for recurrent inguinal hernia was conducted by Beets *et al.,* A total of 79 patients were randomized to 37 patients to the open procedure and 42 who underwent the laparoscopic procedure (TAPP). The postoperative morbidity was lower in the laparoscopic group, but the operation was technically more difficult than the open procedure. This study concluded that both procedures were effective in the management of recurrent inguinal hernias(Beets *et al.,* 1999).

A randomized multicenter trial comparing laparoscopic and Lichtenstein repair for recurrent inguinal hernia was conducted by Eklund *et al.,* A total of 147 patients were included, of which 73 underwent the TAPP procedure and 74 underwent the Lichtenstein repair. The TAPP procedure was associated with reduced postoperative morbidity, but the recurrence rate was equal between the two procedures(Eklund *et al.,* 2007).

A systematic review of outcomes comparing laparoscopic versus open mesh repair for recurrent inguinal hernia was conducted by Dedemadi *et al.,* A total of 12 studies with 1542 patients were included in this study, and the laparoscopic repair was associated with fewer complications, such as hematoma and seroma formation(Dedemadi *et al.,* 2010).Pisanu *et al.,* conducted a meta-analysis and review of prospective randomized trials comparing laparoscopic and

Lichtenstein techniques in recurrent inguinal hernia repairs. A total of 7 studies with 647 patients were included, of which 333 underwent the laparoscopic repair and 314 underwent the Lichtenstein repair. The patients who underwent the laparoscopic procedure had reduced postoperative pain and faster return to work, but the operative time was longer. This study showed the advantages of laparoscopic repair, but the choice of which procedure will depend on the availability of expertise(Pisanu *et al.,* 2015). A similar meta-analysis of randomized controlled trials comparing laparoscopic with open inguinal hernia repair by Karthikesalingam *et al.,* and Yang *et al.,* also concluded the same (Karthikesalingam *et al.,* 2010; J. Yang *et al.,* 2013).

A systematic review and meta-analysis on laparoscopic versus open mesh repair for the treatment of recurrent inguinal hernia was conducted by Chan *et al.,* A total of 10 studies with 1017 patients were included in this study, and there were no differences in postoperative complications, chronic pain, and recurrence rates between the two procedures, with the laparoscopic repair having a longer operative time(C. Yang & Deng, 2020).Another meta-analysis comparing laparoscopic versus open procedures in the treatment of recurrent inguinal hernia was conducted by Li *et al.,* A total of 1311 patients from 6 studies were included in this study, and there were no differences in the postoperative complication and recurrence rates between the two procedures(Li *et al.,* 2014).

Table I

Study	Study Type	Year	N=numbers	Recurrence rate of open repairs (%)	Recurrence rate of laparoscopic repairs (%)
Eklund *et al.,*	Randomized multicenter trial	2007	147	18%	19%
Kouhia *et al.,*	Prospective randomized trial	2009	99	6.4%	0%
Pisanu *et al.,*	Meta-analysis	2013	647	11.6%	8.3%

The table shows the recurrence rate after open and laparoscopic repairs for recurrent inguinal hernias.

Open pre-peritoneal repair for recurrent inguinal hernias

This approach has been used for the treatment of recurrent inguinal hernias, whereby the transversalis fascia is incised and the preperitoneal space is entered. The hernia sac is identified and reduced, and a large mesh (15cm by 12cm) is anchored with sutures over the conjoint tendon and iliopubic tract. This procedure is ideal for recurrent hernias as it involves the use of the preperitoneal space, which is free from adhesions from the previous surgery. This procedure is associated with reduced postoperative complications, like wound hematoma or seroma formation(Katri, 2009). A prospective study was performed by Kurzer *et al.,* on the preperitoneal mesh repair for recurrent inguinal hernias in 101 patients, and there were no major postoperative complications, and there was a low recurrence rate(Kurzer *et al.,* 2002).The long-term outcomes for open pre-peritoneal mesh repair for recurrent inguinal hernias were assessed by Yang *et al.,* who followed up 107 patients over 5 years. The overall complication rate was 8.4% and the recurrence rate was 3.2%(B. Yang *et al.,* 2015).

Feliu *et al.,* conducted a prospective study on both the open and laparoscopic preperitoneal repair for recurrent inguinal hernias. A total of 188 patients were included in this study, and 121 underwent the open procedure and 86 underwent the laparoscopic procedure. The postoperative complications were more in the open procedure than the laparoscopic one, but the chronic pain and recurrence rates were similar in both groups(Feliu *et al.,* 2004).The open preperitoneal repair was compared with the Lichtenstein repair for recurrent inguinal hernia in a randomized study by Saber *et al.,* The recurrence rate was lower in the preperitoneal repair, and it proved to be superior to the standard Lichtenstein repair(Saber *et al.,* 2012). Another prospective study comparing the open pre-peritoneal approach against the transabdominal preperitoneal (TAPP) approach for recurrent inguinal hernias was conducted by Awad *et al.,* A total of 74 patients were included in this study, and there were no differences concerning postoperative complications, chronic pain, and recurrence rates between the two procedures (Awad *et al.,* 2024).A similar study comparing the open and laparoscopic repair for recurrent inguinal hernias by Alani *et al.,* also concluded the same(Alani *et al.,* 2006).

A systematic review on the open preperitoneal groin hernia repair with mesh was conducted by Andresen *et al.,* A total of 67 studies were included, with 956 patients included in this study. The various surgical incisions and methods to access the preperitoneal space were discussed. The placement of the mesh in the preperitoneal space and the advantage of preventing missed hernias, like femoral hernias, from occurring. This method, however, will require training to prevent complications like injury to the bladder and iliac vessels(Andresen & Rosenberg, 2017).The acceptance of open preperitoneal repair for inguinal hernia surgery will depend on the training of this procedure, and this may lead to an increased use of this procedure(Lorenz *et al.,* 2024).

Table II

Study	Study type	Year	N=numbers	Recurrence rate from open preperitoneal repairs	Recurrence rate from laparoscopic preperitoneal repairs
Beets *et al.,*	Randomized control trial	1999	79	1.9%	12.5%
Feliu *et al.,*	Prospective study	2003	188	1.8%	1.3%
Awad *et al.,*	Prospective study	2024	74	8.1%	2.7%

The table shows the recurrence rates following open and laparoscopic pre-peritoneal repair for recurrent inguinal hernias.

CONCLUSION

The management of recurrent inguinal hernias is an area of controversy, with the principle of management being dictated by the type of primary hernia repair. With Lichtenstein repair being the most common type of primary repair, a pre-peritoneal repair via an open or laparoscopic method should be the operation of choice for the repair of recurrence. If the recurrence has occurred from a laparoscopic approach, then an anterior approach like the Lichtenstein method should be performed. If laparoscopic inguinal hernia repair is not available, then an open pre-peritoneal approach should be considered to repair a recurrent inguinal hernia. The open pre-peritoneal repair should be encouraged if there is no expertise to perform a laparoscopic repair, as this can be performed as an open procedure and can be performed under spinal anesthesia. The surgical treatment of recurrent inguinal hernia will require consultation with senior surgeons to decide which type of repair will be suitable for these patients.

Conflict of Interest: There is no conflict of interest.

REFERENCES

- Alani, A., Duffy, F., & O'Dwyer, P. J. (2006). Laparoscopic or open preperitoneal repair in the management of recurrent groin hernias. In *Hernia* (Vol. 10, Issue 2, pp. 156–158). https://doi.org/10.1007/s10029-005-0052-4
- Andresen, K., & Rosenberg, J. (2017). Open preperitoneal groin hernia repair with mesh: A qualitative systematic review. In *American Journal of Surgery* (Vol. 213, Issue 6, pp. 1153–1159). Elsevier Inc. https://doi.org/10.1016/j.amjsurg.2017.01.014
- Antoniou, S. A., Pointner, R., & Granderath, F. A. (2014). Current treatment concepts for groin hernia. In *Langenbeck's Archives of Surgery* (Vol. 399, Issue 5, pp. 553–558). Springer Verlag. https://doi.org/10.1007/s00423-014-1212-8
- Awad, P. B. A., Hassan, B. H. A., Kashwaa, M. F. A., & Abdel-Maksoud, I. M. (2024). A comparative study between open pre-peritoneal approach versus laparoscopic trans-abdominal pre-peritoneal approach in recurrent inguinal hernia repair: a prospective cohort study. *Hernia*, *28*(2), 629–635. https://doi.org/10.1007/s10029-024-02967-4
- Barrat, C., Surlin, V., Bordea, A., & Champault, G. (2003). Management of recurrent inguinal hernias: A prospective study of 163 cases. *Hernia*, *7*(3), 125–129. https://doi.org/10.1007/s10029-003-0130-4
- Beets, G. L., Dirksen, C. D., Go, P. M., Geisler, F. E., Baeten, C. G., & Kootstra, G. (1999). Open or laparoscopic preperitoneal mesh repair for recurrent inguinal hernia? A randomized controlled trial. *Surgical endoscopy*, *13*(4), 323–327. https://doi.org/10.1007/s004649900981
- Bittner, R., & Schwarz, J. (2012). Inguinal hernia repair: Current surgical techniques. In *Langenbeck's Archives of Surgery* (Vol. 397, Issue 2, pp. 271–282). https://doi.org/10.1007/s00423-011-0875-7
- Burcharth, J., Pommergaard, H. C., Bisgaard, T., & Rosenberg, J. (2015). Patient-related risk factors for recurrence after inguinal hernia repair: A systematic review and meta-analysis of observational studies. In *Surgical Innovation* (Vol. 22, Issue 3, pp. 303–317). SAGE Publications Inc. https://doi.org/10.1177/1553350614552731
- Choi, Y. Y., Kim, Z., & Hur, K. Y. (2010). The safety and effectiveness of laparoscopic total extraperitoneal (TEP) repair for recurrent inguinal hernia after open hernioplasty. *Journal of laparoendoscopic & advanced surgical techniques. Part A*, *20*(6), 537–539. https://doi.org/10.1089/lap.2010.0029
- Dedemadi, G., Sgourakis, G., Radtke, A., Dounavis, A., Gockel, I., Fouzas, I., Karaliotas, C., & Anagnostou, E. (2010). Laparoscopic versus open mesh repair for recurrent inguinal hernia: A meta-analysis of outcomes. In *American Journal of Surgery* (Vol. 200, Issue 2, pp. 291–297). Elsevier Inc. https://doi.org/10.1016/j.amjsurg.2009.12.009
- Eklund, A., Rudberg, C., Leijonmarck, C. E., Rasmussen, I., Spangen, L., Wickbom, G., Wingren, U., & Montgomery, A. (2007). Recurrent inguinal hernia: Randomized multicenter trial comparing laparoscopic and Lichtenstein repair. *Surgical Endoscopy and Other Interventional Techniques*, *21*(4), 634–640. https://doi.org/10.1007/s00464-006-9163-y
- Feliu, X., Torres, G., Viñas, X., Martínez-Ródenas, F., Fernández-Sallent, E., & Pie, J. (2004).

Preperitoneal repair for recurrent inguinal hernia: Laparoscopic and open approach. *Hernia*, *8*(2), 113–116. https://doi.org/10.1007/s10029-003-0179-0

- Garg, P., Menon, G. R., Rajagopal, M., & Ismail, M. (2010). Laparoscopic total extraperitoneal repair of recurrent inguinal hernias. *Surgical Endoscopy*, *24*(2), 450–454. https://doi.org/10.1007/s00464-009-0602-4
- Goo, T. T., Lawenko, M., Cheah, W. K., Tan, C., & Lomanto, D. (2010). Endoscopic total extraperitoneal repair of recurrent inguinal hernia: A 5-year review. *Hernia*, *14*(5), 477–480. https://doi.org/10.1007/s10029-010-0675-y
- Haggerty, S., Forester, B., Hall, T., Kuchta, K., Linn, J., Denham, W., & Ujiki, M. (2021). Laparoscopic repair of recurrent inguinal hernia offers similar outcomes and quality of life to primary laparoscopic repair. *Hernia*, *25*(1), 165–172. https://doi.org/10.1007/s10029-020-02211-9
- Jansen, P.L., Klinge, U., Jansen, M. *et al.* Risk factors for early recurrence after inguinal hernia repair. *BMC Surg* **9**, 18 (2009). https://doi.org/10.1186/1471-2482-9-18
- Junge, K., Rosch, R., Klinge, U., Schwab, R., Peiper, C., Binnebösel, M., Schenten, F., & Schumpelick, V. (2006). Risk factors related to recurrence in inguinal hernia repair: A retrospective analysis. *Hernia*, *10*(4), 309–315. https://doi.org/10.1007/s10029-006-0096-0
- Karthikesalingam, A., Markar, S. R., Holt, P. J. E., & Praseedom, R. K. (2010). Meta-analysis of randomized controlled trials comparing laparoscopic with open mesh repair of recurrent inguinal hernia. *British Journal of Surgery*, *97*(1), 4–11. https://doi.org/10.1002/bjs.6902
- Katri, K. M. (2009). Open preperitoneal mesh repair of recurrent inguinal hernia. *Hernia: The Journal of Hernias and Abdominal Wall Surgery*, *13*(6), 585–589. https://doi.org/10.1007/s10029-009-0520-3
- Keidar, A., Kanitkar, S., & Szold, A. (2002). Laparoscopic repair of recurrent inguinal hernia: Long-term follow-up. *Surgical Endoscopy and Other Interventional Techniques*, *16*(12), 1708–1712. https://doi.org/10.1007/s00464-002-8906-7
- Köckerling, F., Bittner, R., Kuthe, A., Hukauf, M., Mayer, F., Fortelny, R., & Schug-Pass, C. (2017). TEP or TAPP for recurrent inguinal hernia repair—register-based comparison of the outcome. *Surgical Endoscopy*, *31*(10), 3872–3882. https://doi.org/10.1007/s00464-017-5416-1
- Kouhia, S. T. H., Huttunen, R., Silvasti, S. O., Heiskanen, J. T., Ahtola, H., Uotila-Nieminen, M., Kiviniemi, V. V., & Hakala, T. (2009). Lichtenstein hernioplasty versus totally extraperitoneal laparoscopic hernioplasty in treatment of recurrent inguinal hernia: a prospective randomized trial. *Annals of Surgery*, *249*(3), 384–387. https://doi.org/10.1097/SLA.0b013e318196d0b0
- Kurzer, M., Belsham, P. A., & Kark, A. E. (2002). Prospective study of open preperitoneal mesh repair for recurrent inguinal hernia. *British Journal of Surgery*, *89*(1), 90–93. https://doi.org/10.1046/j.0007-1323.2001.01956.x
- Lee, S. S., Jung, H. J., Park, B. S., Son, G. M., & Cho, Y. H. (2016). Surgical Aspects of Recurrent Inguinal Hernia in Adults. *The American surgeon*, *82*(11), 1063–1067.
- Li, J., Ji, Z., & Li, Y. (2014). Comparison of laparoscopic versus open procedure in the treatment of recurrent inguinal hernia: A meta-analysis of the results. In *American Journal of Surgery* (Vol. 207, Issue 4, pp. 602–612). Elsevier Inc. https://doi.org/10.1016/j.amjsurg.2013.05.008
- Lorenz, R., Akkersdijk, W., Paiva De Oliveira, G., Warren, T., & Soler, M. (2024). Acceptance of Open Preperitoneal Repair in Inguinal Hernia Surgery Delphi-Consensus After an Anonymous International Survey Among European Hernia Society Members. *Journal of Abdominal Wall Surgery*, *3*. https://doi.org/10.3389/jaws.2024.13840
- Magnusson, N., Nordin, P., Hedberg, M., Gunnarsson, U., & Sandblom, G. (2010). The time profile of groin hernia recurrences. *Hernia*, *14*(4), 341–344. https://doi.org/10.1007/s10029-010-0648-1
- McAllister, J., & Blatnik, J. A. (2018). Recurrent Inguinal Hernia Repair. In *Surgical Principles in Inguinal Hernia Repair: A Comprehensive Guide to Anatomy and Operative Techniques* (pp. 159–164). Springer International Publishing. https://doi.org/10.1007/978-3-319-92892-0_21
- McBee, P., Walters, R., & Fitzgibbons, R. (2022). Current status of inguinal hernia management: A review. In *International Journal of Abdominal Wall and Hernia Surgery* (Vol. 5, Issue 4, pp. 159–164). Wolters Kluwer Medknow Publications. https://doi.org/10.4103/ijawhs.ijawhs_36_22
- Pisanu, A., Podda, M., Saba, A., Porceddu, G., & Uccheddu, A. (2015). Meta-analysis and review of prospective randomized trials comparing laparoscopic and Lichtenstein techniques in recurrent inguinal hernia repair. In *Hernia* (Vol. 19, Issue 3, pp. 355–366). Springer-Verlag France. https://doi.org/10.1007/s10029-014-1281-1
- Saber, A., Ellabban, G.M., Gad, M.A. *et al.* Open preperitoneal versus anterior approach for recurrent inguinal hernia: a randomized study. *BMC Surg* **12**, 22 (2012). https://doi.org/10.1186/1471-2482-12-22
- Sevonius, D., Gunnarsson, U., Nordin, P., Nilsson, E., & Sandblom, G. (2011). Recurrent groin hernia surgery. *British Journal of Surgery*, *98*(10), 1489–1494. https://doi.org/10.1002/bjs.7559
- Tazaki, T., Sasaki, M., Kohyama, M., Sugiyama, Y., Yamaguchi, T., Takahashi, S., & Nakamitsu, A. (2021). Laparoscopic transabdominal preperitoneal repair for recurrent groin hernia after failed anterior-posterior repair. *Asian Journal of Endoscopic*

Surgery, *14*(3), 470–477. https://doi.org/10.1111/ases.12899

- Tran, H. Endorsement of the HerniaSurge guidelines by the Australasian Hernia Society. *Hernia* **22**, 177 (2018). https://doi.org/10.1007/s10029-017-1673-0
- Ung, H., & Au, L. (2004). ENDOSCOPIC TOTALLY EXTRAPERITONEAL INGUINAL HERNIOPLASTY FOR RECURRENCE AFTER OPEN REPAIR. In *ANZ J. Surg* (Vol. 74).
- Yang, B., Jiang, Z. P., Li, Y. R., Zong, Z., & Chen, S. (2015). Long-term outcome for open preperitoneal mesh repair of recurrent inguinal hernia. *International Journal of Surgery*, *19*, 134–136. https://doi.org/10.1016/j.ijsu.2015.05.029
- Yang, C., & Deng, S. (2020). Laparoscopic versus open mesh repair for the treatment of recurrent inguinal hernia: A systematic review and meta-analysis. *Annals of Cardiothoracic Surgery*, *9*(3), 1164–1173. https://doi.org/10.21037/apm-20-968
- Yang, J., Tong, D. N., Yao, J., & Chen, W. (2013). Laparoscopic or Lichtenstein repair for recurrent inguinal hernia: A meta-analysis of randomized controlled trials. In *ANZ Journal of Surgery* (Vol. 83, Issue 5, pp. 312–318). https://doi.org/10.1111/ans.12010