



# Academic perspective on the clinical application of novel predictive risk factor for recurrence in laparoscopic ventral hernia repair

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Comment on: Hauters P, Desmet J, Gherardi D, *et al.* Assessment of predictive factors for recurrence in laparoscopic ventral hernia repair using a bridging technique. *Surg Endosc* 2017;31:3656-63.

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The authors should be congratulated on a well written manuscript that fulfills the attempt to identify risk factors for recurrence in laparoscopic ventral hernia repair (LVHR). The inclusion of the ratio of mesh area to defect area (*M/D* ratio), a rarely described parameter, clearly offers surgeons another factor to account for during the operation to ensure a successful repair with low recurrence rate.

The best technique for ventral hernia repair is still a debatable topic. With the advent of laparoscopic techniques in the 1990's, there are data proven advantages which include short length of hospital stay, decreased surgical site morbidity, and most importantly a low recurrence rate. One of the issues comparing datasets of laparoscopic and open techniques and even within laparoscopic surgery is the variation in techniques by surgeons. The most common is the bridging technique with mesh overlap first described by Leblanc in 1993. Further work by his group found that increasing mesh overlap from <3 to >5 cm decreased hernia recurrence rate from 8.6% to 1.4% (1). However, there is clearly a limitation to the size of the defect that can be addressed with LVHR unless fascial closure is attempted.

Recent literature has looked at other factors besides obtaining a pure mesh overlap of >5 cm to help prevent hernia recurrence rates (2). In particular, Tulloh *et al.* introduced the concept of a mesh to defect area ratio (*M/D* ratio), in which the size of the defect and the subsequent area dictates the force exerted upon the mesh increases as the defect increases per the mathematical formula  $P = F/A$  (3). Thus, the pressure exerted on the mesh increases, and logically increasing the size of the mesh in a proportional

fashion would lead to less hernia recurrence than purely basing hernia repair on a set mesh 5 cm overlap for hernias of all sizes.

Hauters *et al.* were able to analyze 213 patients over a 14-year period. The average BMI was 32 which are consistent with obesity being an indication for LVHR. With mean follow-up of 69 months, a 7.5% recurrence was noted. Univariate analysis is consistent with prior publications with higher recurrence rate for incisional hernias, BMI  $\geq 35$ , larger defects, and smaller mesh overlap. Multivariate logistic analysis revealed that *M/D* ration was the only independent predictive factor for recurrence. This highlights the importance of this manuscript and substantiates that this measurement should be noted at time of repair.

Besides mesh overlap, a number of studies have also focused on whether an optimal fixation technique exists to prevent mesh migration and improve mesh incorporation and ingrowth, while minimizing post-operative pain. A variety of techniques including tacks, transfascial sutures and tacks, only transfascial sutures, double crown of tacks, etc. have been employed to identify the ideal mesh fixation. A systematic review of mesh fixation by Reynvoet *et al.* examined a total of 25 different studies aimed at identifying the optimal technique concludes that no particular benefit for one particular technique over another in terms of preventing recurrence (4). Post-operative pain was equivocal in all the techniques examined, due to peritoneal trauma from mesh fixation.

There are also studies which have analyzed whether

laparoscopic closure of the fascia defect; instead of bridging repair prior to mesh incorporation may be an important factor that aims at decreasing hernia recurrence. Suwa *et al.* reviewed studies in which laparoscopic fascial closure is combined with intraperitoneal onlay mesh repair and found that incorporating a fascial closure technique has not been shown to definitely decrease hernia recurrence rates or decrease post-operative complications such as seroma formation or mesh eventration (5).

These studies highlight the shortcomings of current hernia repair techniques and a lack of general consensus regarding the most optimal laparoscopic approach to repairing ventral hernias. While decreasing recurrence is the ultimate goal of any hernia repair, it seems that the key factors in creating a lasting repair involve allowing maximal mesh incorporation to withstand continual intraabdominal forces pressing outward to displace any repair. Using a one size fits all approach to identify factors that lead to recurrence is failing to take into account the variety of ventral hernias that exist in a diverse patient population. Inclusion of a M/D ratio demonstrates that in laparoscopic repairs of varying hernia defects, using singular criteria such as mesh overlap may not provide an adequate indication of whether or not a hernia repair is prone to recurrence.

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