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Best evidence topic: Should ventral hernia repair be performed at the same time as bariatric surgery?

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HIGHLIGHTS

- There is a paucity of evidence on this topic & overall, the quality is poor.
- Some of the selected studies contradict each other.
- The studies affirm the risk of small bowel obstruction if hernias are left alone.
- SSI rates are low during concomitant bariatric surgery & mesh repair of hernia.
- A case by case approach is best, with an open discussion of the risks & benefits.

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ABSTRACT

A best evidence topic has been constructed using a described protocol. The three-part question addressed was: In morbidly obese patients undergoing bariatric surgery, when a ventral hernia is picked up in clinic or intraoperatively is concurrent repair of the hernia better than delayed repair after weight loss with regards to complication rates? Using the reported search, 179 papers were found. 5 studies were deemed to be suitable to answer the question.

All 5 studies assessed were non randomised studies either retrospective or prospective and the overall quality of these studies was poor. The outcomes assessed were incidence of complications associated with hernia repair (recurrence, infection) and deferral of repair (small bowel obstruction). The patient's symptoms and anatomy is important in determining the timing of repair.

The evidence does not provide a consensus for the optimal timing of ventral hernia repair for patients undergoing bariatric surgery, with some of the selected studies contradicting each other. However, the studies do affirm the risk of small bowel obstruction if hernias are left alone. The reported rate of surgical site infection is low when mesh repair is performed at the same time as weight loss surgery.

Until large volume, high quality randomized control trials can be performed, a case by case approach is best, where the patients' symptoms, anatomy, type of bariatric surgery and their personal preferences are considered, and an open discussion on the risks and benefits of each approach is undertaken.

1. Introduction

This BET was devised using a framework outlined by the International Journal of Surgery [1]. This format was used because a preliminary literature search suggested that the available evidence is of insufficient quality to perform a meaningful meta-analysis. A BET provides evidence based answers to common clinical questions, using a systematic approach of reviewing the literature.

2. Clinical scenario

You are a general surgery trainee. You are in the bariatric surgery clinic and review a 45 year old lady who is morbidly obese, and is a suitable candidate for weight loss surgery. On clinical examination you palpate a ventral hernia. You wonder whether it is better to repair the hernia at the same time as surgery, or on a separate

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occasion following a period of weight loss. You conduct a literature search to source the answer.

3. Three part question

In [morbidly obese patients with a ventral hernia undergoing bariatric surgery] is [immediate repair of the hernia at the time of bariatric surgery preferable to delayed hernia repair following weight loss] with regards to [complications of the hernia repair or delaying hernia repair].

4. Search strategy

A. No Best BETs or other synoptic evidence was found on this topic.

B. Cochrane library.

'(Bariatric surgery) AND (ventral hernia OR umbilical hernia)' No Cochrane review was found on this subject.

C. www.clinicaltrials.org was searched for an ongoing trial on this topic. No relevant trial was found on this subject.

D. MEDLINE (through Pubmed)

1) (bariatric surgery) AND hernia ventral, ((bariatric surgery) AND ventral hernias) AND treatment outcomes, (umbilical hernia) AND bariatric surgery. Limit to human and English language.

E. EMBASE.

1) (bariatric surgery) AND hernia ventral, ((bariatric surgery) AND ventral hernias) AND treatment outcomes, (umbilical hernia) AND bariatric surgery. Limit to human and English language.

5. Search outcomes

The literature search yielded 179 results on Medline and 237 results on Embase. The titles and abstracts of these papers were scanned and 13 papers were identified. Of these 12 were original research articles and 1 was a review. Studies that did not compare immediate repair with deferred repair were excluded. The review that was found was a literature review that did not review any studies that compared immediate repair with deferred repair, and was thus also excluded. Thus, 5 papers were deemed to provide the most relevant evidence to answer this BET. These were of sufficient quality and represent the best evidence. These are summarised in Table 1.

6. Discussion

Eid et al. [2] retrospectively analysed a cohort of 85 patients with a ventral hernia (VH) who underwent laparoscopic Roux en Y gastric bypass surgery (LRYGB). Patients were allocated to one of three approaches to the hernia: LRYGB and concomitant primary repair with sutures (CPRS) (n = 59), LRYGB and concomitant mesh repair (CMR) (n = 12), and deferred repair (DR) (n = 14). The outcomes were post-operative length of stay (LOS), and complications of hernia repair and delay of hernia repair (recurrence, infection and bowel obstruction). There was no recurrence in patients undergoing mesh repair within the follow up period for these patients (mean follow up = 13 months), though three patients had cellulitis and four patients had seroma. Patients who had CPRS were followed up for 30 months on average. The recurrence rate in this group was 22%. Of the patients that had DR, 35.7% had small bowel obstruction (SBO) due to incarceration with the average time for presentation being 63 days. Eid et al. conclude that CMR at the time of LRYGB is the optimal strategy. This is a small, single centre retrospective study. There are differences in the size of the three groups, as well as the duration of follow up for two groups where concurrent hernia repair was undertaken.

Bonatti et al. [3] conducted a study of 9 patients who underwent incisional hernia (IH) repair and laparoscopic gastric band (LGB). 3 of these patients developed their IH after their bariatric surgery, and thus were excluded from our study. Of the remaining 6 patients, 2 underwent CPRS at the time of the LGB, and neither had a recurrence (median follow up = 34 months; range = 13–69 months). Of the 4 patients who had DR, 2 suffered SBO secondary to incarcerated IH, and required emergency surgery. The authors do not state how long after their LGB these patients presented with SBO; nor do they state how long after LGB the other 2 patients had their hernia repair. This study concludes that small IHs (less than 3 cm) can be repaired safely with a low risk of recurrence with sutures alone. Bonatti et al. concluded that for large IH which require mesh, the operative strategy should be formulated on a case by case basis. This is a very small, single center retrospective study, with a wide range of follow up duration.

Newcomb et al. [4] carried out a retrospective analysis of 27 patients that had gastric bypass surgery – 22 had open Roux en Y bypass (ORGB), and 5 had LRYGB. There were three groups of patients: CPRS at the time of bypass (n = 4), CMR at the time of bypass using biological mesh (n = 3) and DR (n = 20). All 7 patients that had hernia repair at the time of bypass suffered recurrence. In the CMR group I patient had dehiscence of the biological mesh and required a re-operation. One patient (5%) had SBO eleven months after bypass, which required emergency surgery. None of the patients that had DR had recurrence or an infection. The study concludes that hernia repair should be performed after bypass surgery. This is a small, single center retrospective study. The size of the cohorts varies considerably. It is also unusual in that the majority of patients had open bypass surgery, rather than laparoscopic and this certainly does not reflect current practice.

Datta et al. [5] undertook a retrospective study of 26 patients who underwent LRYGB and CPRS (n = 8), CMR with synthetic mesh (n = 10) and DR (n = 8). Outcomes were LOS (days), rates of recurrence and SBO. The mean follow up time was 14 months. LOS was longer when patients underwent hernia repair at the same time as LRYGB (2.7 days on average, compared to 1.6 days for those who had repair deferred); undergoing repair with mesh was found to be the only predictor for this increased LOS (odds ratio 9.2, p = 0.002). Of the 8 patients that had undergone CPRS, 2 (25%) presented with SBO secondary to hernia recurrence, and required urgent surgery. None of the patients who had mesh repair developed a recurrence or infection. None of the 8 patients who had DR developed SBO whilst waiting for their hernia repair. The study concludes that CPRS at the time of bariatric surgery has a risk of recurrence. Mesh repair, either deferred or concomitantly, is preferable and has a low risk of infection, although LOS may be longer. This is a small, single center retrospective study.

Another study from Eid's group prospectively enrolled 28 consecutive patients with ventral hernia and needing bariatric surgery into a study to evaluate an algorithmic approach to their surgery [6]. The first step was categorizing these patients into whether their hernia was symptomatic or asymptomatic; and whether their anatomy was "favorable", or "unfavorable". Six criteria was used to determine this. Criteria deemed to be favourable included: a gynecoid shape, a small (<8 cm), reducible, central hernia in patients with a BMI <50 and abdominal wall thickness of <4 cm. Thus patients were placed into 4 treatment groups: Group 1) symptomatic patients with favorable anatomy, Group 2) asymptomatic patients with favorable anatomy, Group 3) symptomatic patients with unfavorable anatomy, and Group 4) asymptomatic patients with unfavorable anatomy (n = 3). Each group received different treatment:

Group 1 (n = 3) – laparoscopic CMR of the ventral hernia with permanent mesh, followed by bariatric surgery, on average, 6

Table 1
Papers demonstrating best evidence.

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Additional comments
Eid et al. [1], 2004, USA	85 patients with VH undergoing LRYGB: CPRS (n = 59) CMR (n = 12) DR (n = 14)	Retrospective, single centre observational study Level IIc evidence	LOS (days) Complications: recurrence, infection and SBO	Reports no significant difference between groups for LOS Recurrence rate with CPRS = 22% Recurrence rate with CMR = 0 Three patients in mesh repair group developed wound cellulitis Rate of SBO secondary to hernia with DR = 35.7%	Modified Rives-Stoppa technique used for CMR Length of follow up between CPRS group and CMR group differs considerably (30 months and 13 months respectively) Size of groups differs considerably Small single centre retrospective study
Bonatti et al. [2],2004, Austria	6 patients with IH undergoing LGB: CPRS (n = 2) Deferred DR (n = 4)	Retrospective, single centre observational study. Level IIc evidence.	Complications: recurrence and SBO	Median follow up = 34 months Recurrence rate across both groups = 0 Rate of SBO secondary to hernia with DR = 50%	Two patients presenting with SBO underwent emergency sublay CMR Small single centre retrospective study.
Newcomb et al. [4], 2008, USA	27 patients with VH undergoing LRYGB or ORYGB: CPRS (n = 4), CMR (n = 3) DR (n = 20)	Retrospective, single centre observational study Level IIc evidence	Complications: mesh infection, recurrence and SBO	Mean follow up after VH repair = 20 months. Recurrence rate with CPRS = 100% Recurrence rate with CMR = 100% Rate of infected mesh = 33% Rate of SBO secondary to hernia with DR = 5% Recurrence rate with DR = 0	Modified Rives-Stoppa technique used for CMR in ORYGB; transabdominal approach for CMR in LRYGB Majority of patients in this study underwent open bypass Small single centre retrospective study Size of groups differs considerably
Datta et al. [5] 2008, USA	26 patients with VH undergoing LRYGB: CPRS (n = 8) CMR (n = 10) DR (n = 8)	Retrospective, single centre observational study Level IIc evidence	LOS (days) Complications: mesh infection, recurrence and SBO	Mean follow up = 14 months Mean LOS in CPRS and CMR = 2.7 days Mean LOS in DR = 1.6 days Recurrence rate with CPRS = 25% Recurrence rate with CMR = 0 0 reports of mesh infection 0 reports of SBO secondary to hernia with DR	CMR was predictor for increased LOS (odds ratio 9.2, p = 0.002) Transabdominal approach in CMR Small single centre retrospective study
Eid et al. [9] 2013, USA	28 patients with VH and requiring bariatric surgery: Group 1 (n = 3) – laparoscopic, permanent CMR followed by LRYGB at a later date Group 2 (n = 20) – concomitant laparoscopic, biological CMR and LRYGB Group 3 (n = 2) – 12 week weight loss diet followed by concomitant laparoscopic, biological CMR and bariatric surgery Group 4 (n = 3) – bariatric surgery, followed by laparoscopic, permanent CMR at a later date	Prospective, single centre observational study. Level IIc evidence.	Complications: mesh infection, recurrence and SBO	Rate of mesh infection across all groups = 0 Recurrence rate in Group 1 = 0 Recurrence rate in Group 2 = at least 10%, but likely higher for patients followed up for longer Recurrence rate in Group 3 = 0 Recurrence rate in Group 4 = 33% Rate of SBO in Group 4 = 33%	Small and varying number of patients in each treatment group Criteria used to categorize patients into groups were subjective. Follow up period not clearly defined and variable Different meshes used in CMR

Abbreviations: VH – ventral hernia; LRYGB – laparoscopic Roux en Y gastric bypass; LOS – days; CPRS – concomitant primary repair with sutures; CMR – concomitant mesh repair; DR – deferred repair; LGB – laparoscopic gastric band; IH – incisional hernia; ORYGB – open Roux en Y gastric bypass.

months later.

Group 2 (n = 20) – laparoscopic CMR with biological mesh and bariatric surgery at the same time.

Group 3 (n = 2) – medically supervised weight loss diet for 12 weeks, followed by laparoscopic CMR with biological mesh and bariatric surgery at the same time.

Group 4 (n = 3) – bariatric surgery, followed by laparoscopic CMR with permanent mesh 9–18 months after the bariatric surgery, depending on rate of weight loss.

Where RYGB and hernia repair were being performed concomitantly, biological mesh was used to prevent mesh infection; when these operations were being performed separately, permanent mesh was used.

Outcomes were rate of recurrence, mesh infection and SBO. The precise duration of follow up is not clear – it is stated that follow up was for "at least 2 years". Group 1 had no recurrences. Group 2 saw no recurrence at 13 months; however, at 30 months, 50% of these patients had been lost to follow up, and the other 50% all had recurrences. There were no recurrences in Group 3. In group 4, one patient, whose hernia repair was delayed because of slow rate of weight loss, suffered SBO secondary to incarcerated ventral hernia 18 months after their bariatric surgery. This patient underwent emergency laparoscopic repair of the hernia, but suffered a recurrence afterwards. There were no mesh infections reported in any of the groups. The small and varying numbers in each treatment group in this paper makes it difficult to draw firm conclusions from its results. The paper proposes an algorithm that can be used in the management of such patients. The authors suggest that the operative strategy for each patient be considered on a case by case basis, taking into account their symptoms and anatomy.

The evidence from these papers is very weak. The number of patients is too small to draw meaningful conclusions on whether hernia surgery and bariatric surgery should be performed simultaneously or separately. Moreover, bar one, they are all retrospective.

The results of the studies are not consistent – for example, Eid et al. demonstrate that concomitant mesh repair may be favorable, whilst Newcombe et al. conclude that hernia repair should take place after weight loss surgery. The collated studies do appear to affirm the risk of SBO secondary to incarcerated hernias, if left alone – all of the studies (except for Datta et al.) report a number of patients needing emergency surgery when repair has been deferred.

The most oft cited reason for deferring hernia repair with synthetic mesh is the potential risk of contamination, and thus infection, that comes with procedures where the stomach or small intestine are opened. With this in mind, one can thus hypothesize that this risk is negligible when patients undergo LGB. The collated studies here actually indicate that the risk of infection when prosthetic mesh is used during bariatric surgery may be lower than initially thought, with 3 out of the 5 studies reporting no mesh infections. This should be considered in the context of the risk of recurrence when primary suture repair alone is undertaken – in the 4 studies where a cohort of patients underwent CPRS [2,3,4], recurrences are reported. Bonatti et al. reported no recurrences in 2 patients undergoing CPRS – but these defects were less than 3 cm. Numerous other studies indicate that the use of mesh during either LSG or LRYGB is safe. Raziel et al. [7] reported on 54 concurrent ventral hernia repairs and found no surgical site infections, despite the use of mesh in all the cases. A large retrospective analysis of 17,117 patients undergoing LSG or LRYGB did show that simultaneous hernia repair was associated with surgical site infection (SSI) – superficial, deep and organ space infections; however, there was no association with overall morbidity [8]. This study also demonstrated that there was no significant difference in SSI rate between LSG and LRYGB [8]. Both LSG and LRYGB are clean-contaminated operations; however, one can envisage that the degree of contamination is potentially higher in LRYGB – indeed, Cozacov et al. [9] performed intraperitoneal cultures of patients having LSG and LRYBG, and found that only patients undergoing the latter procedure were culture positive.

It should be highlighted that we have only considered papers written in English in this BET.

As the current evidence is weak, we suggest that a case by case approach is best. Clinical and radiological assessment of the hernia can be useful in determining the risk of recurrence or incarceration, whilst the type of bariatric procedure may determine the risk of SSI. The symptoms of the hernia, and the patients' wishes with regards to these risks, and whether they would prefer one procedure, or a staged one, are of course important considerations in this discussion. The options need not be limited to just simultaneous or deferred repair – concomitant CPRS, where feasible, followed by a planned CMR thereafter is a viable strategy. A large, prospective randomized controlled trial addressing the question would of course be helpful, but enrolling large numbers of patients is likely to be difficult.

7. Clinical bottom line

There is insufficient evidence to provide a consensus as to the best timing for ventral hernia repair in patients undergoing bariatric surgery. Repair with sutures alone is likely to only benefit those with small hernias; whilst the strategies of performing simultaneous mesh repair or deferring it may carry risks to patients. Thus, an individualized approach to each patient is reasonable. The risks and benefits of simultaneous repair or deferred repair need to be discussed with the patient. The type of bariatric surgery, hernia anatomy, symptoms and type of hernia repair are all factors that need to be taken into consideration.

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Author contribution

MS Sait – conducted literature search and wrote paper.
R Som – conceived paper, assisted in literature search and writing of paper.
CM Borg – assisted in writing of paper.
A Chang – assisted in writing of paper.
S Ramar – assisted in writing of paper.

Conflicts of interest

none.

Guarantor

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