

Laparoscopic Radical Prostatectomy in Obese Patients: Feasible or Foolhardy?

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More than 70% of men who are candidates for radical prostatectomy can be classified as either overweight or obese by body mass index. The role for laparoscopic radical prostatectomy (LRP) in treating these patients remains to be defined. A wealth of experience from bariatric surgery confirms that laparoscopic procedures can be performed successfully, even in the setting of morbid obesity, despite well-defined derangements in respiratory dynamics. Using the technical modifications outlined here, LRP can be performed safely and effectively in obese patients. Obesity raises the degree of difficulty for LRP, however, resulting in longer operative times and possibly a higher rate of open conversion. For this reason, surgeons early in their LRP experience are advised to avoid obese patients until they have become facile in the performance of LRP in normal-weight individuals.

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Currently, the management options for clinically localized prostate adenocarcinoma are more numerous than ever before. Classically, these options included radical retropubic prostatectomy (RRP), radical perineal prostatectomy (RPP), external beam radiotherapy, and brachytherapy. Over the past 5 years, however, laparoscopic approaches to radical prostatectomy have enjoyed a widening appeal among urological oncologists, driven by patient desire for more minimally invasive surgical approaches to prostate cancer therapy. Originally

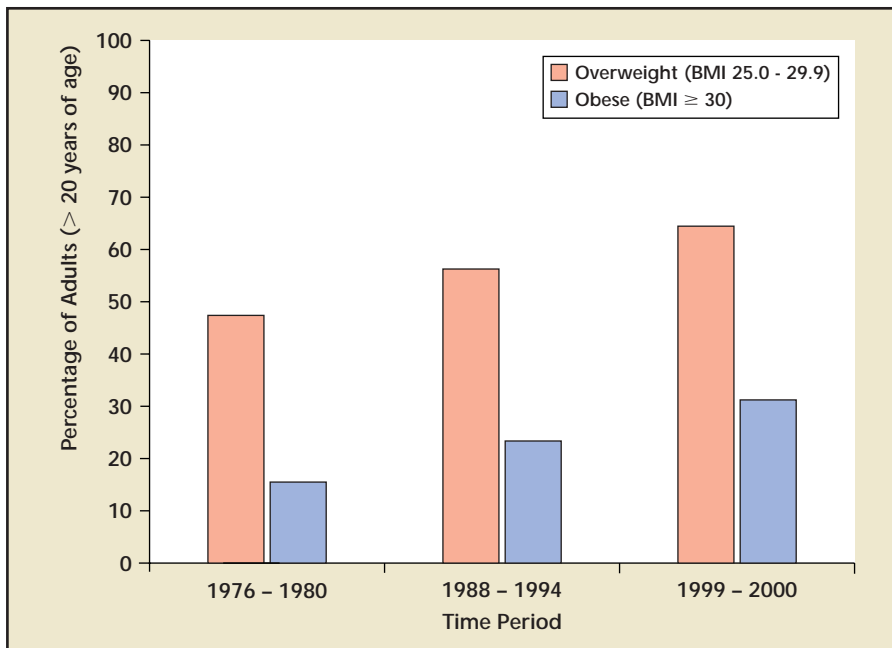


Figure 1. Percentage of overweight and obese adults in the United States stratified by body mass index (BMI; kg/m²). Data from the 1999–2000 National Health and Nutrition Examination Survey.¹

limited to academic centers with extensive experience in advanced laparoscopic techniques, laparoscopic radical prostatectomy (LRP) and its robotic-assisted variants have now ramified to a much broader cross-section of urologic centers.

Although early LRP series documented high positive margin rates,

significant advantages or disadvantages to LRP from a sexual function standpoint remains an open question and would be best addressed by a randomized, direct comparison with RRP.

Choosing the approach for radical prostatectomy for potent patients with localized prostate cancer remains a decision driven more by

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particularly at the prostatic apex, technical evolutions have addressed this issue effectively. Contemporary series now report T2 positive margin rates of 5% to 7%. Moreover, intermediate-term data suggest equivalent oncologic outcomes for LRP and RRP. From an incontinence standpoint, LRP appears to be comparable to RRP and is associated with a low rate of postoperative bladder neck contractures (~2%). Whether there are

urologic surgeon preference and experience than by universal standards for patient selection.

Obesity and Prostate Cancer Surgery

The 1999–2000 National Health and Nutrition Examination Survey¹ defines an adult as overweight when body mass index (BMI; kg/m²) is between 25 and 29.9 and obese when BMI is 30 or above. This report

estimates that 64% of adults in the United States are either overweight or obese. Moreover, this proportion appears to be increasing over time (Figure 1). For males aged 55 to 74 years of age, the proportion of overweight individuals is even higher (> 72%). Because this age range encompasses the majority of men diagnosed with clinically localized prostate cancer who are surgical candidates, obesity clearly plays a key role in determining the surgical approach.

Classically, RPP was favored in the obese patient because approaching the prostate through the perineum avoids operating through a large abdominal pannus, with its associated risks of poor exposure and wound complications. However, for cases where pelvic lymphadenectomy is indicated, the perineal approach has clear disadvantages. Moreover, sexual function outcomes after RPP have received much less investigation, compared with RRP, perhaps due to the small percentage of RPP patients who have bilateral nerve preservation. Yang and colleagues² published an elegant health-related quality-of-life analysis of RPP patients using the validated Expanded Prostate Cancer Index Composite (EPIC) questionnaire in 2004. In this representative study, only 23% of men underwent unilateral nerve preservation, and none had bilateral nerve sparing. Therefore, for potent overweight men with small-volume disease who strongly desire bilateral nerve preservation, the choice of approach generally favors RRP. Where does LRP fit into this treatment algorithm?

Laparoscopy in Obese Patients

Laparoscopic radical prostatectomy is a demanding procedure with unique technical features that impact its application to an obese patient. These include potentially long operative times, the necessity of

prolonged Trendelenberg positioning, and technical challenges reaching structures in the deep pelvis. Although very little has been published about LRP in obese patients, some information can be extrapolated from the field of minimally invasive bariatric surgery. It is important to emphasize, however, that the morbid obesity (BMI ≥ 40) of the bariatric surgery population should be considered an extreme case of the more common mild-to-moderate obesity encountered in surgical candidates for radical prostatectomy.

Intraoperative Respiratory Dynamics

Obesity can have deleterious effects on respiratory mechanics, lung compliance, and functional residual capacity during laparoscopy.^{3,4} This is particularly relevant to LRP, where long operative times and prolonged Trendelenberg positioning can lead to problematic hypercapnia, even in normal-weight individuals.

Prior to pneumoperitoneum, morbidly obese patients have larger ventilatory requirements than do normal-weight patients to maintain normocapnia (6.3 vs 5.4 L/min).³ During pneumoperitoneum, increases in tidal volume decrease PaCO₂ to a lesser degree than in normal-weight patients. Trendelenberg positioning in normal-weight individuals has only a modest negative effect on lung compliance,⁵ and these patients generally require only a 20% to 30% increase in minute ventilation to maintain normocapnia.⁶ Morbidly obese patients may require an additional 15% increase in minute ventilation in the head down position to do so.³ Theoretically, these changes in respiratory dynamics may impair the obese patient's ability to clear CO₂ during laparoscopy and predispose toward hypercapnia.

In practice, however, these alterations in respiratory dynamics do not

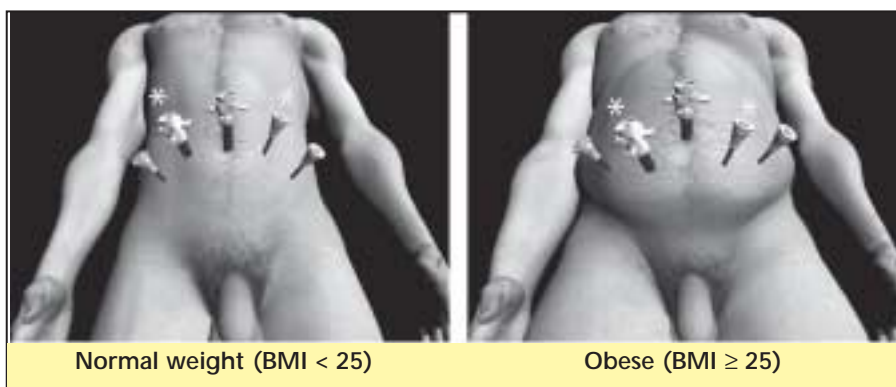


Figure 2. Comparison of trocar positions for normal-weight and obese patients undergoing laparoscopic radical prostatectomy. Note the caudal shift of the 2 working trocars (*) in the obese patient to facilitate suturing of the urethrovesical anastomosis. BMI, body mass index (kg/m²).

appear to be clinically significant, at least during bariatric surgical procedures lasting 2 to 3 hours. Careful anesthesia care can compensate for these issues and allow laparoscopy in obese individuals to proceed safely.⁴ Likewise, we have routinely performed 4- to 5-hour LRP procedures in moderately obese men (BMI 30–35) without problematic hypercapnia.

Technical Considerations

Significant obesity necessitates even greater care in operative positioning during LRP. In normal-weight patients, the upper chest is carefully taped to the table to provide support during

challenging in obese patients, and a longer Veres needle (150 mm vs 120 mm) may be required. In some cases, a larger periumbilical incision suitable for prostate specimen extraction can be made at the start of the procedure down to the level of the abdominal fascia. This facilitates elevation of the fascia under direct vision and more straightforward placement of the Veres needle. Alternatively, the Hasan technique for direct transperitoneal access can be used.

Operative exposure for laparoscopy in obese patients can also be a problem in the supine position. The need to elevate a large pannus may require

Information relevant to laparoscopic radical prostatectomy can be extrapolated from the field of minimally invasive bariatric surgery.

periods of Trendelenberg positioning. For obese patients, this band of tape should be wider and more generously padded to support the extra weight. These patients may be at greater risk for postoperative neuropraxia and intraoperative restriction of respiratory excursion. It seems prudent, therefore, to limit Trendelenberg positioning as much as possible in these cases.

Abdominal insufflation using the Veres needle technique may be more

increased intraabdominal insufflation pressures with resulting undesirable demands on respiratory dynamics.⁷ It is also critical to have sufficient trocar length to prevent inadvertent trocar migration into the subcutaneous tissues. Trocars should be sutured securely to the skin surface, and in some cases, extra-long trocars (150 mm vs 100 mm) may be required and should be available. In particular, if the insufflating trocar tip pulls back

into the subcutaneous tissues, rapid CO₂ absorption and problematic hypercapnia can result. In patients with thick abdominal walls, reaching the deep pelvis for anastomotic suturing can be impossible with standard LRP trocar positioning and regular laparoscopic instruments. We routinely shift our working trocars somewhat caudally to facilitate comfortable

keep out of the operative field and necessitate undesirably long intervals of Trendelenberg positioning. Some authors have recommended an extraperitoneal approach to LRP in this setting to address this issue.⁸

Postoperative Complications

The impact of obesity on postoperative complication rates following

scopically cholecystectomy.¹³ There is no evidence, however, that trocar sites have a higher risk of wound infection than do traditional “open” incisions in obese patients.

Operative Time and Open Conversion

As outlined above, technical challenges related to obesity can increase the difficulty of LRP. This may be reflected in both longer operative times and higher rates of open conversion, although data addressing this issue are currently limited. El-Feel and colleagues¹⁴ report an average of 38 minutes more operative time for obese patients in a series of 100 consecutive LRP cases. Likewise, despite an overall open conversion rate of only 1.9%, Bhayani and colleagues¹⁵ cite obesity as the reason for open conversion in 2 of 13 cases (15%).

Conclusion

At the current time, relevant outcomes data for evaluating the role of LRP in obese patients are lacking. If we extrapolate from the bariatric surgery experience, reconstructive laparoscopy can be done safely and effectively in the morbidly obese. The technical adjustments described in this article may be helpful in

Careful removal of fat on the anterior prostatic surface and endopelvic fascia will ease dissection and limit frustration later in the procedure.

suturing (Figure 2). If this shift is too extreme, however, instruments can be blocked by the pubic symphysis. Extra-long laparoscopic instruments, if available, are an excellent alternative that avoids this problem.

Obese patients may also have abundant fat around the bladder and prostate. Careful removal of fat on the anterior prostatic surface and endopelvic fascia will ease dissection and limit frustration later in the procedure. Likewise, completely releasing the lateral attachments of the bladder will facilitate a tension-free urethrovesical anastomosis.

In patients with copious mesenteric fat, bowel may be difficult to

laparoscopic surgery remains controversial. Several studies have shown no significant increase in postoperative complications following laparoscopic hysterectomy,⁹ nephrectomy,¹⁰ and cholecystectomy.¹¹ There are data, however, suggesting that obese patients may have an increased risk of wound infection, as compared with normal-weight controls, after laparoscopic surgery. Pilarsky and colleagues¹² report >4-fold higher rates of postoperative ileus and wound infection in obese patients undergoing laparoscopic colorectal surgery. Likewise, higher rates of wound infection were observed for obese patients undergoing laparo-

Main Points

- More than 70% of men who are candidates for radical prostatectomy can be classified as either overweight or obese, based on body mass index.
- Although specific data on laparoscopic radical prostatectomy (LRP) in obese patients are lacking, useful information can be extrapolated from the experience with laparoscopic bariatric surgery. Even in morbidly obese individuals, complex laparoscopic procedures can be performed successfully with acceptable morbidity.
- Although obesity can have deleterious effects on intraoperative respiratory dynamics, careful anesthetic care during laparoscopy can generally compensate adequately for these issues.
- Several technical adjustments should be considered to ease performance of LRP in obese patients. These include the use of extra-long trocars and instruments, adjustment of trocar positioning, and avoidance of prolonged periods of Trendelenberg positioning.
- Obesity raises the degree of difficulty for LRP, which is already a challenging and lengthy laparoscopic procedure. Surgeons early in the learning curve for LRP are encouraged to postpone its application to obese patients until they have achieved significant experience with the procedure in normal-weight individuals.

applying LRP to a similar, if perhaps less extremely overweight, patient population. It is also important to realize that obesity raises the degree of difficulty of an already challenging laparoscopic procedure. For this reason, it is recommended that surgeons accumulate significant experience with LRP in normal-weight individuals before applying it to this challenging patient population. ■

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