Laparoscopic Inguinal Hernioplasty in Aviators

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INGUINAL HERNIOLAPSY is the most common surgical procedure performed in Western countries (13). In the United States, 800,000 inguinal hernias were surgically corrected in 2003, most by Lichtenstein and plug hernioplasties. Of these operations, 90% involve the use of mesh prostheses and were performed on an outpatient basis (13). Open anterior mesh repairs are associated with more post-operative pain and discomfort compared with the laparoscopic approach (1).

Laparoscopic hernia repair has been developed over the past decade with promising results, although large randomized comparison studies have not yet been published (8,12). The technique has become the standard of care for bilateral inguinal hernias and recurrent hernias following anterior repair, but has been criticized for technical difficulties, cost, and a long learning curve (16,18). Most studies criticizing the use of laparoscopic surgery for inguinal hernia repair were based on the use of the trans-abdominal preperitoneal (TAPP) technique (5), which penetrates the abdominal cavity, leading to an increased possibility of injury to the intraperitoneal contents (6,11). The newer totally extraperitoneal laparoscopic (TEP) technique combines the advantages of minor access surgery and mesh reinforcement of the groin. This approach is associated with early post-operative return to usual activities and a very low recurrence rate (15).

It is unclear whether exposure to high acceleration (+Gz) in high performance aircraft increases the absolute risk for inguinal herniation, but fear that this might be the case restricts fighter pilots who undergo hernia repair from prompt return to the cockpit. Despite operational demands for quick return of aviators to full activity, including flight in high-performance aircraft, current recommendations are for a waiting period of 6 wk before return to the cockpit following inguinal hernia repair. In this manuscript we present four cases of aviators, three of whom were military jet fighter pilots, who underwent the TEP procedure for inguinal hernia repair and were returned to the cockpit after 3 wk. We believe that this will encourage use of laparoscopic procedures for the repair of inguinal hernias in aviators in order to enable quicker return to the cockpit.

Case Presentations

Patient 1: A 48-yr-old Grobe instructor pilot presented with right groin pain. On physical examination a right inguinal hernia and an umbilical hernia were found. A TEP laparoscopic repair was performed. He returned to flying duty in 21 d and was followed for 180 d with no complications or recurrence.

Patient 2: A 41-yr-old F-16 pilot reported to the Israeli Aeromedical Center with a sensation of left groin fullness. On physical examination a left inguinal hernia was discovered and he underwent a TEP laparoscopic repair. He returned to military flight 21 d after the procedure and was followed for 150 d with no evidence of recurrence or other complications.

Patient 3: A 40-yr-old F-16 pilot reported to the Israeli Aeromedical Center with a sensation of right groin fullness. Bilateral inguinal hernia was found on physical examination and was operated on through the TEP laparoscopic approach. He was returned to flying duty after 21 d and was followed for 1100 d with no evidence of complications or recurrence.

Patient 4: A 21-yr-old F-16 pilot reported to the Israeli Aeromedical Center with left groin pain, increasing on exercise. A left inguinal hernia was revealed on physical examination. He was operated on through a TEP laparoscopic procedure and returned to flying duty 21 d after the procedure. Follow-up of 90 d revealed no early complications or evidence of recurrence.

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DISCUSSION

Prompt return of military personnel to active duty is a constant operational demand, being particularly important in aviators, in whom experience is invaluable. A large study recently published compared the laparoscopic technique with an open technique for the repair of inguinal hernia. This study found that the open technique is superior to the laparoscopic technique in terms of recurrence and complication rates. Laparoscopy was found superior in terms of post-operative pain and return to normal activities (10). In that study, most laparoscopic procedures were performed by the TEP technique (90%) and the recurrence rate was strongly associated with the surgeon’s experience (equal to the open technique in those with over 250 laparoscopic procedures performed). Our cases were operated on by an experienced surgeon, and the expected recurrence rate was similar to that of the open technique with the advantage of quicker recuperation.

The advantages of the laparoscopic technique in terms of less post-operative pain and quicker return to work were demonstrated in other studies as well (2,8). Celenk et al. recommended the use of laparoscopic surgery in military personnel who need to return to work quickly (3). In this regard, the use of laparoscopic surgery in military aviators is certainly the procedure of choice for inguinal hernia repair as it enables the aviators to return more quickly to their working environment. However, the mean cost of a laparoscopic repair is substantially more than the open repair (17), but this is insignificant in the military environment as the expenses of modern aviation are significantly higher.

The influence of a high +Gz environment on inguinal hernia repair has not been clearly established, although it has been predicted that the Valsalva maneuver performed during high +Gz maneuvers may increase the chances of recurrences. This hypothesis prompted flight surgeons to keep high-performance aviators from returning to the cockpit any earlier than 6 wk after the inguinal hernia repair. This waiting period may be unacceptably long in operational settings and needs to be re-evaluated further in light of the laparoscopic procedures performed for the repair of inguinal hernias.

Numerous studies compared the TAPP and TEP approaches for the repair of inguinal hernias. Cocks found a shorter operating time and earlier return to normal activities with use of the TEP approach (4). Kald et al. found a shorter period off work in patients who underwent TEP as compared with TAPP (7). The learning curve for TEP is relatively long, but the good results achieved with this operation have prompted more and more surgeons to make use of this procedure as the procedure of choice for inguinal hernia repair, whether unilateral or bilateral. The short rate of recurrence, short recuperation time, and low rate of complications makes this approach appealing for the patients as well. The need for a quick return to active duty prompted us to recommend this procedure in our patients.

The relationship between exposure to high +Gz forces and inguinal hernia has not been demonstrated in randomized clinical trials. A case of acute inguinal herniation in flight has been described (14) as has a case of diaphragmatic rupture (9), but these are anecdotal reports. Therefore, it is unclear whether our cases were related to increased intra-abdominal pressure elevation as part of the anti-G straining maneuvers, but the fact that three of the cases appeared at the age of 40, after many years of exposure to acceleration forces, argues against a cause and effect relationship. We believe that had there been a relation between the two, the hernias would have appeared at a much earlier stage of the aviators’ flying career, but we cannot definitively rule out this relationship. The aviators were returned to active duty after a relatively short period based on the dramatic clinical improvement following surgery. The minimal waiting period prior to return to the cockpit was chosen to be 3 wk. This period was chosen because most surgeons recommend 14 d before return to full physical activity. Because we believed that exposure to Gz forces places more stress on the surgical wound than most physical activities, we chose to delay the return of these aviators to the cockpit by an additional week, and the aviators were returned to the cockpit after 21 d. Our hypothesis was that the increased intra-abdominal pressure reinforces the mesh used to prevent recurrence of the hernia and an early return to flight will decrease the chance of later recurrence. This hypothesis needs to be evaluated in larger clinical trials. The lack of early complications following exposure to high gravitational forces supports our hypothesis that this exposure would not result in recurrence of the hernia. Long-term follow-up for 3 yr was completed in only one of the patients with no evidence of recurrence, while the other three patients were followed for shorter periods.

CONCLUSIONS

The laparoscopic approach is a safe and effective procedure for the repair of inguinal hernias. If performed by an experienced surgeon, it has a low rate of recurrence, a relatively low rate of complications, and a short recuperation time. Thus we believe that this procedure should be strongly considered in aviators, provided it is performed by an experienced surgeon. Long-term prospective studies are still required to compare laparoscopic and open techniques in aviators and to evaluate the effects of increased intra-abdominal pressure on the rate of recurrence of inguinal hernias.

REFERENCES