

Direct Trocar Insertion Versus Veress Needle Insertion in Laparoscopic Cholecystectomy

LAPAROSKOPİK KÖLESİSTEKTOMİ İÇİN OLUŞTURULAN PNÖMOPERİTONDA VERESS İĞNESİ SOKULMASI YÖNTEMİNE KARŞILIK DİREK TROKAR SOKULMASI YÖNTEMİ

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Summary

This study was undertaken to retrospectively assess the safety of Veress needle insertion compared to direct disposable shielded trocar insertion for the creation of pneumoperitoneum during laparoscopic cholecystectomy (LC).

One thousand four hundred patients undergoing LC with pneumoperitoneum were included in this study. In 450 patients the Veress needle insertion technique and in 950 patients direct trocar insertion technique was used. Patients having indications for open trocar insertion were excluded from the study.

Complication rate was significantly higher in Veress needle group ($p < 0.01$), and the two major complications, gastric perforation and iliac artery laceration, were also among this group.

Our results suggest that; with less complication rates, direct insertion of the disposable trocar should be the procedure of choice for the creation of pneumoperitoneum. Such an approach has further advantages such as less cost/instrumentation and rapid creation of pneumoperitoneum.

Key Words: Laparoscopic cholecystectomy, Pneumoperitoneum, Complications

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Laparoscopic cholecystectomy (LC) mandates the implementation of successful pneumoperitoneum in the vast majority of patients since the so called "gasless" technique does still require further refinement (1,2). Among general surgeons, the world-wide preferred technique for the creation of

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Özet

Bu çalışma laparoskopik kolesistektomi esnasında pnömoperiton oluşturmak için yapılan Veress iğnesi sokulması ile direk "disposable" trokar sokulması yöntemlerinin güvenilirliğini retrospektif olarak araştırmak amacıyla yapıldı.

Çalışmaya pnömoperiton oluşturularak yapılan 1400 laparoskopik kolesistektomi olgusu alındı. 450 hastada Veress iğnesi, 950 hastada ise direk trokar tekniği ile pnömoperiton oluşturuldu. Açık teknikte trokar sokulması gereken hastalar seri dışında bırakıldı.

Komplikasyon oranları Veress iğnesi grubunda anlamlı oranda fazla idi ($p < 0.01$) ve iki büyük komplikasyon da (gastrik perforasyon ve iliak arter luserasyonu) bu grupta gözlemlendi.

Sonuçlarımızın ışığı altında; pnömoperiton oluşturulmasında, daha düşük komplikasyonlu direk "disposable" trokar sokulması yönteminin tercih edilmesi gerektiği kanısındayız. Böyle bir yaklaşım ayrıca daha ucuz, teknik olarak daha kolay ve pnömoperiton oluşturmada daha hızlı olduğundan ek avantajlar da getirecektir.

Anahtar Kelimeler: Laparoskopik kolesistektomi, Pnömoperiton, Komplikasyonlar

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pneumoperitoneum is the conventional Veress needle insertion method (1). Nevertheless, several reports from gynecological centers pointed out that, direct insertion of the trocar, without previous pneumoperitoneum, is a safe alternative to Veress needle insertion (3-7). The disposable shielded trocars have also been used for direct insertion (3); but to our knowledge only one study has prospectively evaluated the efficiency / safety of this instrument in comparison to Veress needle insertion in a small number of gynecological patients (8). To further assess this issue in general surgical practice; we retrospectively investigated the pros and cons of direct disposable-shielded trocar insertion in comparison to Veress needle insertion.

Material and Methods

Records of all patients who had undergone LC between November 1992-January 1998 were analyzed. Excluding patients in whom pneumoperitoneum was created using an open technique, 1400 patients who had undergone LC using closed pneumoperitoneum techniques were identified. Retrospective analysis of these 1400 patients revealed two distinct groups with special reference to the method of creation of pneumoperitoneum. Classical Veress needle insertion technique was used in 450 patients (Group A) and direct disposable shielded trocar insertion was used in 950 patients (Group B). There were no specific indications for a particular insertion technique to be used in favor to the other one and surgeon's preference determined the type of insertion. All insertions were done through an infraumbilical 1-1.3 cm size transverse incision with strict adherence to the universal precautions as outlined elsewhere (1,9). Operations were performed by experienced hepatobiliary surgeons or under their supervision and the series does not include the learning curve of any surgeon involved.

Veress needles were either reusable or disposable type (Autosuture or Ethicon) and trocars were all disposable shielded type (Autosuture or Ethicon). All trocars were used repetitively after being gas sterilized. In Group-A the intraperitoneal position of the Veress needle was confirmed by well known techniques (1, 9). In Group-B proper positioning of inserted trocar was confirmed by insertion of the camera and direct visualization of abdominal cavity.

Complications related to needle or trocar insertion were carefully recorded. Characteristics of the two groups with respect to age, sex, indication for surgery and presence/absence of obesity were determined. Obesity is defined as mean body mass index > 30 where body mass index is patient weight in kilograms per square of the height in meters (kg/m^2). For statistical analysis X² test was used.

Results

The distribution of sex, age, indication for surgery and presence of obesity were similar in both groups. Complications related to both insertion techniques are summarized in Table 1.

Table 1. Complications in Veress needle (group-A) and direct trocar (Group-B) insertion groups

Complications	Group-A		Group-B	
	n	%	n	
Subcutaneous emphysema	30	6.7	4	0.4
Omental emphysema	25	5.5	2	0.2
Omental laceration	8	1.8	3	0.3
Gastric perforation	1	0.2	-	0
Iliac artery laceration	1	0.2	-	* W
Total	65	14.4*	9	0.9*

*p<0.01

It is noteworthy that even minimal subcutaneous and omental emphysemas were regarded as a complication and recorded. Among all complications, only two complications were major (gastric perforation and iliac artery laceration) and these complications resulted in conversion to open surgery and were managed by suturing of the perforated viscus and lacerated vessel, without any further morbidity. All emphysematous complications and all but three patients with omental laceration were managed expectantly with success. In three patients (two from Group-A, one from Group-B) with omental laceration, laparoscopic cauterization-clip application was needed to arrest the bleeding.

Discussion

LC with pneumoperitoneum is the preferred method of cholecystectomy since the recently introduced "gasless" technique has serious limitations especially in patients with obesity (1,2,9). The initial step of LC with pneumoperitoneum is peritoneal entry which is classically accomplished by the insertion of the insufflating Veress needle. This maneuver is intended to decrease the risk of injury to the intraperitoneal organs by the insertion of the trocar. However the insertion of Veress needle itself is not free of complications (6,8,10) and this is also confirmed in recent general surgical practice (11-13). Furthermore, it has been shown that intraabdominal organs are still prone to trocar injury even after successful pneumoperitoneum by

a Veress needle (6) and no "sound" evidence is available concerning the preventive role of Veress needle induced pneumoperitoneum in decreasing the trocar injuries.

Direct insertion of trocar has been reported as a safe alternative to Veress needle insertion (3-7) and this may be particularly true for the recently introduced disposable shielded trocar of the last decade. To date only one study tested the efficiency of direct disposable shielded trocar insertion in comparison to Veress needle insertion in a small number of gynecological patients (8). In their randomized prospective study of 200 patients, Nezhat et al. (8) reported 22%, 6% and 0% rates of minor complications after Veress needle insertion (n: 100), direct conventional laparoscopic trocar insertion (n:50), and direct disposable shielded trocar insertion (n:50) respectively. Our findings are also similar with Nezhat et al's results even though the disposable shielded trocars in our series were used for more than one occasion. In our study, we failed to document any advantage about the use of a Veress needle. In contrast; complications were significantly higher in this group of patients.

Considering the fact that, pneumoperitoneum with Veress needle insertion has actually three blind steps opposed to one in direct trocar insertion; we think that our results are not surprising. During pneumoperitoneum with Veress needle insertion; insertion of needle; pneumoperitoneum through it and; trocar insertion are the three blind steps which reduces to only one, that is insertion of the trocar itself during pneumoperitoneum by direct trocar insertion. Ability to directly visualize the trocar tip location prior to insufflation is a major advantage of direct trocar insertion and it is for this reason that the number of emphysematous complications in our Veress needle group outnumbered similar occurrences in the direct trocar insertion group. Very small number of emphysematous complications (0.6%) that occurred in our direct trocar insertion group resulted from premature insufflation prior to visualization of the trocar tip and therefore theoretically avoidable.

Veress needle has been implicated as the cause of more vascular accidents at laparoscopy than the trocar (10) and many non-comparative/randomized

series have confirmed the safety of direct trocar insertion (3-7).

The results of this present series pointed out the safety of direct disposable shielded trocar insertion with less complications in comparison to Veress needle insertion.

It is noteworthy that the present series excluded patients who had indication for open trocar insertion in whom we used Hasson cannula. We do not use the open technique routinely although there are others advocating the insertion of the first trocar under direct vision at each case (13-17). This is surely a safe alternative but because of its time consuming nature and cost, we use Hasson cannula selectively as many other laparoscopic surgeons.

In conclusion; direct insertion of the disposable shielded trocar is a safe alternative to Veress needle insertion if pneumoperitoneum is going to be created by a closed method.

REFERENCES

1. Zucker KA. Laparoscopic guided cholecystectomy with electro-cautery dissection. In: Zucker KA, ed Surgical laparoscopy. St. Louis: Quality Medical Publishing, Inc. 1991: 143-82.
2. Smith RS, Fry WR, EKM, Henderson VJ et al. Gasless laparoscopy and conventional instruments. The next phase of minimal invasive surgery. Arch Surg 1993; 128: 1102-07.
3. Jarrett JC. Laparoscopy: Direct trocar insertion without pneumoperitoneum. Obstet Gynecol 1990; 75: 725-7.
4. Kaali SG, Bartfai G. Direct insertion of the laparoscopic trocar after an earlier laparotomy. J Reprod Med 1988; 33: 730-40.
5. Saidi MH. Direct laparoscopy without prior pneumoperitoneum. J Reprod Med 1986; 31: 684-6.
6. Copeland C, Wing R, Hulka JF. Direct trocar insertion at laparoscopy. An evaluation. Obstet Gynecol 1983; 62: 655-9.
7. Byron JW, Fujiyoshi CA, Miyazawa K. Evaluation of direct trocar insertion technique at laparoscopy. Obstet Gynecol 1989; 74: 423-5.
8. Nezhat FR, Silfen SL, Evans D, Nezhat C. Comparison of direct insertion of disposable and standard reusable trocars and previous pneumoperitoneum with Veress needle. Obstet Gynecol 1991; 78: 148-50.
9. Karatassas A, Walsh D, Hamilton DW. A safe, new approach to establishing a pneumoperitoneum at laparoscopy. Aust N Z J Surg 1992; 62: 489-91.
10. Buadsgaard SE, Bille S, Egeblad K. Major vascular injury during gynecological laparoscopy. Report of a case and review of published cases. Acta Obstet Gynecol Scand 1989; 68: 283-5.

11. Leo VS, Chan RS, Cucchiaro G, Meyers WC. Complications of laparoscopic cholecystectomy. *Am J Surg* 1993; 65: 527-32.
12. Ress AM, Sarr MG, Nagorney DM- Furnell MB, Donohue JH, Mc Ilrath DC. Spectrum and management of major complications of laparoscopic cholecystectomy. *Am J Surg* 1993; 165: 655-62.
13. McKernan JB, Champion JK. Access techniques: Veress needle- initial blind trocar insertion versus open laparoscopy with the Hasson trocar. *Endosc Surg Allied Technol* 1995;3:35-38.
14. Mayol J, Garcia-Aguilar J, Ortiz-Oshiro E, Carmona JA, Fernandez-Represa JA. Risks of the minimal access approach for laparoscopic surgery: multivariate analysis of morbidity related to umbilical trocar insertion. *World J Surg* 1997;21:529-533.
15. Champault G, Cazacu F, Taffinder N. Serious trocar accidents in laparoscopic surgery: a French survey of 103, 852. *Surg Laparosc Endosc* 1996; 6: 367-370.
16. Bonjer HJ, Hazebroek EJ, Kazemier G, Giuffrida MC, Meijer WS, Lange JF. Open versus closed establishment of pneumoperitoneum in laparoscopic surgery. *Br J Surg* 1997; 84:599-602.
17. Nuzzo G, Giuliani f, Tcbala GD, Vellone M, Cavicchioni C. Routine use of open technique in laparoscopic operations. *J Am Coll Surg* 1997; 184: 58-62.