

## Retroperitoneal Hematoma by Veress Needle During Laparoscopic Surgery: Expectant Management Laparoskopik Cerrahi Sırasında Veress İğnesi ile Retroperitoneal Hematom: Beklenti Yönetimi

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### Summary

Most of the major vascular injuries in laparoscopic surgery occur during insertion of Veress needle or trocar. Veress needle injuries to the large vessels can cause mortality due to CO<sub>2</sub> embolism or hemorrhage without vessel wall laceration. Appropriate management is mandatory to avoid the catastrophic outcome of this complication. We conducted a retrospective view of cases operated in our center and sought appropriate management of major vascular injury with Veress needle. Three cases were identified in five years period. All three had recognised risks for Veress needle injury underwent laparoscopic surgery for benign gynecologic diseases. Safe entry techniques were used however, surgeons who had done these operations had little experience. A retroperitoneal hematoma occurred due to Veress needle insertion to a major vessel in all patients but it wasn't getting larger. Persistent bleeding, hemodynamic deterioration or CO<sub>2</sub> embolism did not observed, therefore, expectant management was decided for all patients. Operative laparoscopy was resumed and any surgical attempt for the injury was not added. Post-operative periods of patients were uneventful and resorption of the hematoma was confirmed with MRI in long term follow up. Persistent bleeding, expanding hematoma and hemodynamic instability need to be performed surgical treatment but expectant management for the minimal vascular injuries with Veress needle may be reasonable.

**Key words:** laparoscopy, major vascular injury, retroperitoneal hematoma, Veress needle

### Özet

Laparoskopik cerrahide görülen başlıca vasküler yaralanmaların çoğu, Veress iğne veya trokar girişinde gerçekleşir. Büyük damarların Veress iğne yaralanmaları, damar duvarı hasarı olmadan, CO<sub>2</sub> embolisi veya kanama nedeniyle mortaliteye neden olabilir. Bu komplikasyonun kötü sonuçlarını önlemek için uygun şekilde yönetimi zorunludur. Merkezimizde opere edilen olguların retrospektif bir görünümünü gerçekleştirdik ve Veress iğne ile büyük çaplı vasküler damar hasarının uygun şekilde yönetimini göstermeye çalıştık. Beş yıl içinde üç vaka tespit edildi. Her üçü de, benign jinekolojik hastalıklar için laparoskopik ameliyat geçiren hastalarda Veress iğne yaralanması olarak rapor edildi. Güvenli giriş teknikleri kullanıldı, ancak bu ameliyatlara yapan cerrahların cerrahi deneyimi azdı. Tüm hastalarda Veress iğne girişinden dolayı retroperitoneal hematoma gelişti, ancak daha büyük boyutlara ulaşmadı. Devam eden kanama, hemodinamik bozulma veya CO<sub>2</sub> embolisi gözlenmediğinden, tüm hastalar için bekleme tedavisine karar verildi. Operatif laparoskopi yenilendi ve cerrahi esnasında yaralanmaya yönelik herhangi bir girişim yapılmadı. Hastaların ameliyat sonrası dönemleri sorunsuz geçti ve uzun dönem izlemde MRG ile hematomun rezorbsiyonu doğrulandı. Devam eden kanama, genişleyen hematoma ve hemodinamik instabilite durumları cerrahi tedavi gerektirir ancak Veress iğnesi ile minimal vasküler yaralanmalar için bekleme tedavisi makul olabilir.

**Anahtar kelimeler:** laparoskopi, büyük vasküler hasar, retroperitoneal hematoma, Veress iğnesi

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## Introduction

Nowadays laparoscopic surgery is performed more frequently in the practice of gynecology. Less bleeding, faster recovery, better cosmetic results due to lack of incision, shorter duration of surgical procedure is important reasons for increasing the choice of laparoscopy for both patient and physician (1). Advanced surgical instruments, experienced surgeons and team, with appropriate patient selection laparoscopic surgery can be done with very good results. Despite advanced surgical techniques and devices, laparoscopy has complications such as laparotomy complications of laparoscopy include hemorrhage, vascular injury, intestinal injury, surgical instruments injury, laparotomy transition, embolism (2,3,4).

As the experience increases in the surgeon, the complication of laparoscopy is reduced. But a low Body mass index (BMI) patient, intraabdominal surgery and anatomic variations can cause life-threatening complications, especially to major vessel injuries (1,3).

Major vascular injury is a rare complication in laparoscopic surgery but it may result in mortality (1,2). Most of these injuries occur during Veress needle or trocar insertion while others occur during surgical dissection (3,4). Formal management must be converting laparoscopy to laparotomy and summoning a vascular surgeon to repair the damage (3,5). However, laparoscopic surgery is considerable (6). In the case of minimal injury with Veress needle, expectant management and complete healing with spontaneous resorption of retroperitoneal hematoma have also been experienced (5). We present our management to three patients with retroperitoneal hematomas as a result of Veress needle injury.

## Case Reports

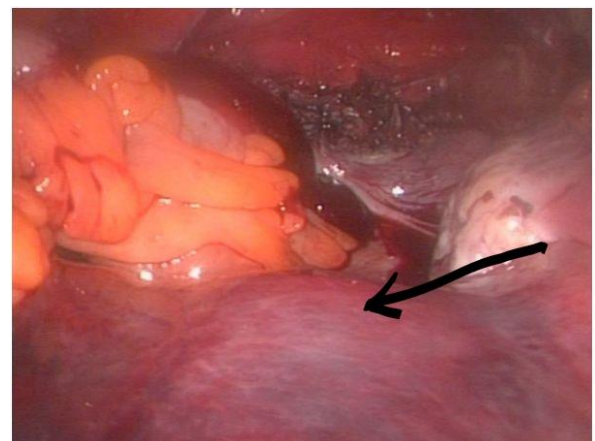
Advanced laparoscopic surgery for benign and malign gynecologic diseases have been performed in the center. Three cases of major vascular injury with Veress needle came to our attention over a five year period. All were operated for benign gynecologic diseases by surgeons with little experience. One of two patients operated for myoma underwent total laparoscopic hysterectomy and the other underwent laparoscopic myomectomy. Laparoscopic endometrioma excision was performed for the third patient.

A reusable, intraumbilical Veress needle was inserted to create pneumoperitoneum in all three cases. 14-16 mmHg pressure was achieved with CO<sub>2</sub> insufflation after aspiration and 'saline syringe test' were negative. The telescope was placed following a 10 mm disposable trocar insertion. Once retroperitoneal hematoma was seen, vascular surgery summoned to the operation. Patients' hemodynamics and hematoma sizes were not changed. Persistent bleeding was not occur. Hence, surgical treatment of injury was not considered. Operations were completed under these conditions. All three cases were retrospectively prepared from patient files, IRB/Ethics Committee ruled that approval was not required for this study.

### Case 1:

Fortythree year old and BMI 19 woman with a history of two open surgery for pylor stenosis underwent total laparoscopic hysterectomy for uterus myomatosis. The presence of unexplained blood in the peritoneal cavity and retroperitoneal hematoma (8-9 cm in diameter) lying over vena cava were recognised with panoramic view at the beginning of the surgery (figure 1). After expectant management was decided considering minimal major vascular injury with Veress needle, laparoscopic surgery resumed and accomplished within 65 minutes. Carefull hemodynamic monitorization continued 48 hours. Post-operative period was uneventful. She was discharged home on post operative day 5 with the information about the complication. The patient was followed up monthly and evaluated with MRI 6 months later. Retroperitoneal hematoma was not seen. Now she is 18 months from her surgery.

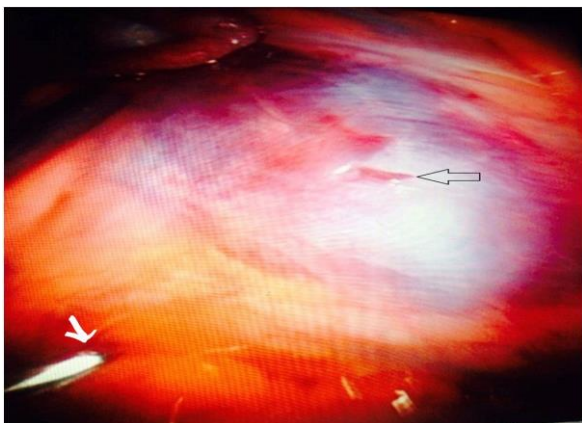
**Figure 1.** Retroperitoneal hematoma (8-9 cm in diameter) lying over vena cava (Black arrow)



**Case 2:**

28 year old and BMI 18 woman underwent operative laparoscopy for endometrioma. She had no previous operation. After the insertion of the telescope, a small amount of blood and retroperitoneal hematoma (5-6 cm in diameter) placing on the left common iliac vessels were seen (figure 2). After the expectant management to the hematoma was decided, laparoscopy was completed within 50 minutes. She had too much pain postoperatively. Hemodynamic monitorization continued 48 hours. MRI was done 40 hours after the operation. Hematoma enlargement or any other pathologic finding were not obtained. She was discharged home on post operative day 7 with the information of complication. The patient was followed up monthly and there was no hematoma 3 months later MRI. The patient is now 28 months out from her surgery.

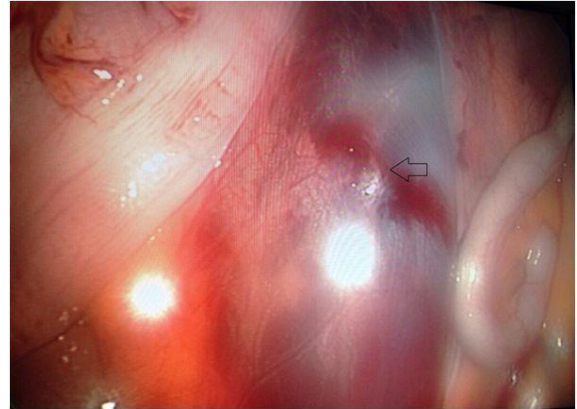
**Figure 2.** Retroperitoneal hematoma (5-6 cm in diameter) placing on the left common iliac (large arrow) and veress needle (thin arrow)



**Case 3:**

32 year old and BMI 18 woman underwent laparoscopic myomectomy for a fundal 7 cm myoma. She had no previous operation. A 5-6 cm diameter retroperitoneal hematoma lying over left common iliac vessels was observed intraoperatively (figure 3). Minimal major vascular injury with Veress needle was diagnosed. Any surgical attempt were not done for the injury. Laparoscopic myomectomy was carried out within 80 minutes. 48 hours hemodynamic monitorization was normal. Her postoperative period was uneventful. She was discharged on postoperative day 6 and followed up monthly. There was no hematoma 6 months later MRI. Now she is 20 months from her surgery.

**Figure 3.** 5-6 cm diameter retroperitoneal hematoma lying over left common iliac vessel (large arrow)



**Discussion**

According to the literature, major vascular injury with Veress needle has been attributed to the operator inexperience mostly (7). On the other hand, low BMI and distorted anatomy due to the diseases or previous operations may be the other reasons (5,8). The aorta may be less than 3 cm below the skin in thin patients. It was noted that cases that have presented were compatible with the literature (table 1).

The position of the needle tip must be checked after the insertion without any movement. In case of malposition of the needle it must be moved out (9). Manipulation of the needle may expose the patient to high risk of vascular injury. Many tests have been proposed for this purpose. If blood returns with aspiration, some authors advise leaving needle in place without any movement (5), others advise moving out (3) for fear that a wider laceration occurs. Small amount of saline syringe performed after aspiration in our method. After the needle insertion (multiple insertion were not done), aspiration was negative and saline drained easily. Hence, the tip of the needle had to be punctured the vessel and moved out soon after.

Aspiration of blood from the needle, sudden decrease of cuff pressure, presence of unexplained blood in the peritoneal cavity or substantial bleeding and retroperitoneal hematoma are the signs of major vascular injury (5). Trocar injuries almost always result in vessel laceration and exhibit dramatic view (10). Rapidly increasing hemoperitoneum or inability to view peritoneal cavity because of persistent bleeding are the signs

of injuries with laseration. On contrary, Veress needle injuries that are usually without laseration may be difficult to recognise. Minimal venous injuries likely cause minimal bleeding under insufflation pressure of 15-20 mmHg. Also arterial injuries likely result in minimal bleeding because the muscular layer of the artery can seal the leak in a little while. A retroperitoneal hematoma shows up with the blood flush from the puncture but it is limited (3,4). Therefore, minimal injuries to the arteries or veins may not cause hemodynamic alteration with persistent bleeding.

Minimal major vascular injury should be suspected with presence of unexplained blood in the peritoneal cavity that can not be attributed to either a pathologic condition or bleeding from the trocar insertion site (3). Exploration of abdominal cavity will show the hematoma under the posterior peritoneum and may be the puncture over it. Most cases in the literature like these, were diagnosed intra-operatively. Delayed diagnoses were also reported between 3 hours to 3 months (10). High intraperitoneal pressure on bleeding vessel and decreased venous return caused by steep Trendelenburg position may complicate the diagnosis during laparoscopy (5).

CO<sub>2</sub> embolism is another major concern if the Veress needle is inserted into the blood vessel (3). Massive venous gas embolism causes decreased blood return to the right side of the heart and can lead to fatal outcome. Tachyarrhythmia and hypotension are initial signs and precordial ‘mill wheel’ murmur is characteristic (11). Both the surgeons and the anesthetists involves laparoscopy must keep in mind massive gas embolism when a vascular injury occurs (6).

Management of major vascular injury with Veress needle should be arranged for two major outcome; gas embolism and hemorrhage. If gas embolism is suspected, insufflation must be stopped first. The patient should be positioned in left lateral and an IV catheter should be placed at the level of right atrium to facilitate aspiration of gas. Mechanical hyperventilation may be usefull (3).

While there are lots of reports on management for vessel lacerations, management for minimal injuries have not been discussed in the literature. In the presence of substantial bleeding or

enlarging hematoma, immediate laparotomy and consultation with a vascular surgeon must be considered as a formal management. In patients with or without embolism who remain stable hemodynamically, immediate laparotomy for hematoma may not be nescessary. It has not been determined how monitorization should be done per/post-operatively, however, Donnez brought up spontaneous resorbsion of retroperitonel hematoma and complete healing in two patients with minimal injury of vena cava in the book of ‘Atlas of Operatif Laparoscopy and Hysteroscopy’ (5).

Laparoscopic surgery has been growing up worldwide and taking place of open surgery. Hence, it is not wrong to think that the frequency of some experience related complications will increase. On the other hand, it is difficult to determine the frequency of major vascular injuries during laparoscopy because these are not always reported; especially minimal injuries. Turning to laparotomy and summoning a vascular surgeon are to be mandatory for vessel laserations, but some of the injuries with Veress needle defined as minimal can be suggested to be managed expectantly, even those have not been reported. These three cases were presented to call attention if this sometimes choosen and often unreported management is actually incorrect or not. If it is appropriate for some patients, monitorization and follow up criteria need to be determined.

**Table 1.** Patient charecteristics

|                           | Case 1 | Case 2 | Case 3 |
|---------------------------|--------|--------|--------|
| Age (year)                | 43     | 28     | 32     |
| BMI (kg/m <sup>2</sup> )  | 19     | 18     | 18     |
| Hematoma diameter (cm)    | 6      | 3      | 6      |
| Hemodynamic alteration    | -      | -      | -      |
| Hematoma resorbtion (MRI) | +      | +      | +      |
| Follow up (month)         | 18     | 28     | 20     |
| Late complication         | -      | -      | -      |

## Consent

The authors declare that written informed consent was obtained from the patient for publication of this case report with accompanying images.

## Competing interests

The authors declare that they have no competing interests.

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