

**Büyük İnsizyonel Hernisi Olan Bir Hastaya Yaklaşım: Komponent Ayırma Yöntemi +  
Yabancı Cisim Çıkarma + Rektus Kılıfının Blok Anestezisi**  
**Approach to a Patient with Huge Incisional Hernia: Component Separation Method +  
Foreign Body Removal + Block Anesthesia of the Rectus Sheath**  
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**Özet**

Karın duvarı defektleri yaygın bir cerrahi patolojidir. Abdominal duvardaki defektin boyutunun artması abdominal duvardaki kasların fonksiyonlarının progresif bozulmasıyla ilişkilidir ve dinamik yapının kaybına yol açar. Bu durum üretkenlik kaybı ve morbiditeyle birlikte sonuç olarak yaşam kalitesinin azalmasıyla sonuçlanır. Bu defektler cerrahi pratiğinde yaygın görülmeleri ve morbidite ile ilişkili olmaları nedeniyle önemli zorluklar içermektedir. Teknik gelişmelere rağmen, tekrarlayan veya büyük fitiklar için ideal cerrahi yaklaşım halen tartışma konusu olmaya devam etmektedir. Büyük defektleri olan hastalarda tedavi seçenekleri oldukça sınırlıdır. Ayrıca onarımı zor olan geniş anterior abdominal duvar defektlerinde cerrahi teknik gözönüne alındığında belirgin bir fikir birliği bulunmamaktadır. Son yıllarda bu tarz defektlerde seperasyon komponent yöntemi giderek artan oranlarda kullanılmaktadır. Bu yaklaşımın çoğu hasta tarafından iyi tolere edilen başarılı alternatif bir cerrahi alternatif olduğunu düşünmekteyiz.

**Anahtar Kelimeler:** Ventral herni, seperasyon komponenti, dinamik rekonstrüksiyon

## **Abstract**

Abdominal wall defects represent a common surgical pathology. Increasing defect size in the abdominal wall is associated with progressive deterioration of the functions of the muscles of the abdominal wall, leading to the loss of its dynamic structure. This, in turn, results in significant loss of productivity as well as morbidity, with a consequent reduction in the quality of life. These defects remain an important challenge in surgery practice due to their common occurrence and associated morbidity. Despite technical advances, the ideal surgical approach for recurrent or huge hernias remain a matter of dispute. Therapeutic options are quite limited in patients with huge defects. Furthermore, no consensus exists regarding the surgical technique for dynamic reconstruction of the large anterior abdominal wall defects that are difficult to repair. In recent years, the “component separation” method has been increasingly used for such defects. We believe that this approach represents a successful alternative surgical therapeutic method well tolerated by most patients.

**Keywords:** Ventral herniation, component separation, dynamic reconstruction

## **Introduction**

Ventral abdominal herniation is a progressive condition associated with a number of problems observed during the expansion phase, including the challenges associated with the use of appropriate techniques during coughing, sneezing, deep breathing, and defecation. Increased defect size in the abdominal wall is associated with impaired muscular function of the abdominal wall, leading to the loss of its dynamic structure. This is reflected in the form of a negative impact on the posture, urination and defecation, active abdominal wall movements, and respiratory functions of the patient. Surgical repair of huge ventral hernias is a challenging intervention that poses problems for the patients and that causes “surface loss” (1). Organ herniation within the abdominal cavity leads to the loss of the space that was previously occupied. Non-use atrophy results in irreversible loss of elasticity in the abdominal walls as well as the depression in the diaphragm caused by loss of space (2).

## **Case Report**

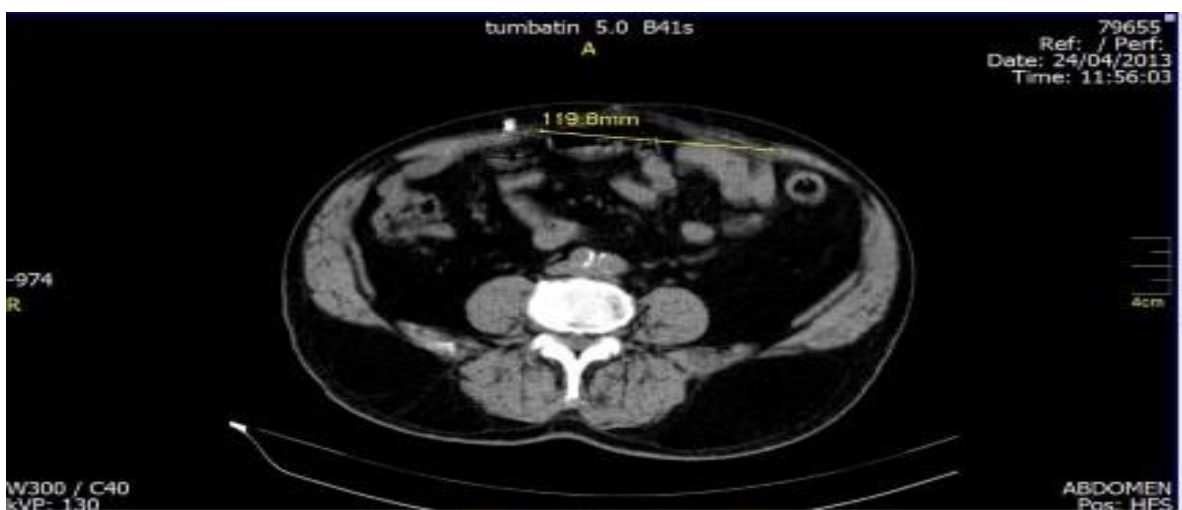
A 78-year old male patient presented to our unit with complaints such as swelling in the abdomen, pain after meals, irregular defecation, inability to sit and stand up without support.

He had a past history of cholecystectomy 6 years ago, in addition to surgery with short time intervals including umbilical hernia repair and 4 separate occasions of incisional hernia repair, as well as two other surgical interventions due to prostate hyperplasia one involving open surgery; he was also previously diagnosed with type 2 diabetes (one year ago) and hypertension.

Physical examination showed median incision scars above and below the level of umbilicus together with mass that is approximately 30x20 cm in size. Intestinal segments were palpable in the herniated area, with thinning of the skin and tenderness, while guarding and rebound were absent. Intestinal sounds were normo-active. Laboratory results were as follows: hemoglobin (Hb) 12.8 g/dl, hematocrit (Hct) 36, leukocytes 10.000/mm<sup>3</sup>, glucose 170 mg/dl, BUN 20 mg/dl, creatinine 0.9

mg/dl, aspartate aminotransferase (AST) 25 U/ml, alanine aminotransferase (ALT) 28 U/ml, amylase 53 U/ml, alkaline phosphatase (ALP) 49 IU/l.

Surgery was recommended. Component separation method was deemed more appropriate for the patient, who was admitted 3 days prior to surgery. Also, consultation was requested from cardiology, anesthesia, and internal medicine departments, in an effort to achieve better control of diabetes and hypertension prior to surgery. An abdominal computed tomography imaging was performed in order to determine the defect size and the distance between two recti muscles for postoperative comparisons. CT imaging revealed a defect width of 119.8 mm and a length of 30 cm, together with a foreign body, approximately 4 cm in diameter (Figure 1).



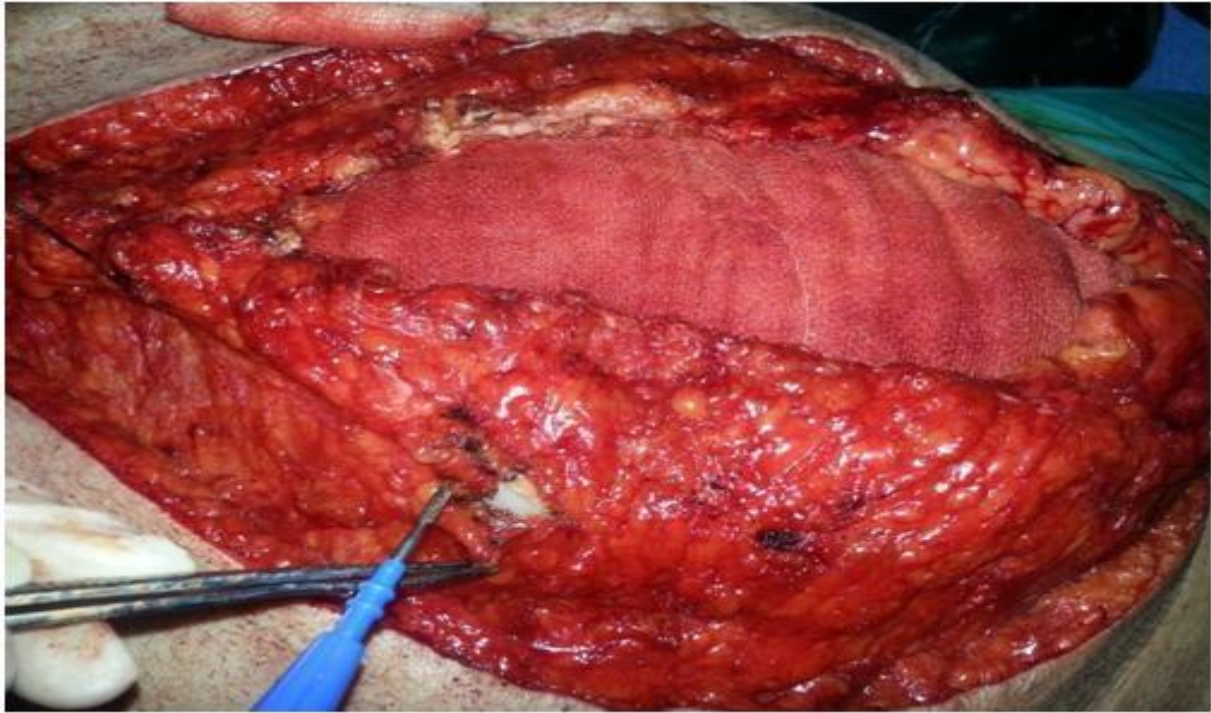
**Figure 1:** Preoperative computed tomography imaging of the abdomen showing the defect size and the foreign body

Also, a decision was made to compare to pre-operative and post-operative intra-abdominal pressure, in order to obtain more information on the pressure gradient in conjunction with laboratory abnormalities in the case of a potential compartment syndrome. A Foley catheter was placed into the urinary bladder for indirect intra-abdominal pressure measurements. This value was 11 mmHg both before and after surgery.

### **Surgical technique:**

Using the previous incision line, a flap of skin and subcutaneous tissue was prepared and displaced laterally. The semilunar line was identified along the insertion of the external oblique muscle. In order to determine and widen the plane located under the external oblique muscle and above the internal oblique muscle, a vertical incision 1 cm lateral and parallel to the semilunar line. To avoid injury of internal oblique muscle and fascia, care was taken not to deepen the incision, assuming that a deeper dissection could damage the segmental innervation of the rectus abdominis muscle or may damage the

Spigelian fascia. Dissection was continued in this relatively avascular inter-muscular area, and was subcutaneously propagated laterally, at least to the axillary line. Each ipsilateral complex could be displaced 4 cm, 8 cm, and 3 cm toward the midline in the upper abdomen, middle abdomen, and lower abdomen, respectively. The inner and outer sheaths of the rectus muscle were dissected and exposed separately. A drainage tube approximately 4 cm in length remaining from a previous surgical intervention was recognized on the rectus muscle and was removed (Figure 2). The muscles were adhered in the midline using non-absorbable sutures. Then, skin flaps were displaced toward the midline and were approached using layered closure. A total of 3 vacuum drainage tubes were used, two under the skin flaps on both sides, and at in the incision site in the pubic area. The rectus abdominis muscle is innervated by the anterior branch of the thoracic nerves 7 to 12 and the lumbar nerve 1. Multimodal anesthesia with early mobilization was scheduled, and rectus sheath catheterization was applied in order to reduce postoperative opioid use.



**Figure 2:** Image obtained during surgery

Oral intake was started on postoperative day 1 with good tolerability. Increasingly reduced volumes of fluid was drained (100 cc/day, 90 cc/day etc.) through Hemovac drains, which were kept in place until the drain volume was below 50 cc. No change in skin vascularization and color of the incision area was noted. Postoperative vital signs were normal, while laboratory results were as follows: Hb 12.6 g/dl, Htc 36, leukocyte 9.000/mm<sup>3</sup>, glucose 170 mg/dl, BUN 30 mg/dl, creatinine 1 mg/dl, AST 35 U/ml, ALT 50 U/ml, amylase 40 U/ml, alkaline phosphatase 66 IU/l. The patient was discharged on postoperative day 7, and a follow-up exam was scheduled 1 week later.

## Discussion

In the last several decades, standard repair of abdominal hernias involve transfer of maximum hernia content into a tight abdominal cavity. This is followed by a patch repair, without any midline defects between rectus muscles. Firstly, displacement of the organs within a tight and tense abdominal wall may lead to significant alterations the in intra-abdominal pressure adequate to cause abdominal compartment syndrome. Secondly, an elevated intra-abdominal pressure may lead to respiratory difficulty secondary to an elevated diaphragm. Finally, decoherence of the patch between rectus muscles may occur, and may lead to infection due to the loss of soft tissue integrity. Component separation technique

is a useful approach for the repair of huge ventral hernias that is different from standard techniques. Separation of rectus muscles from external oblique muscles increases the intra-abdominal volume, and allows re-arrangement of the lost space with a consequent decrease in the risk of respiratory problems associated with hernia repair. Also, patch-related complications are eliminated.<sup>1</sup> “Component separation technique” was originally used in 1990 by Ramirez for the closure of abdominal wall defects, and this technique was used increasingly more commonly since then with multiple modifications by other surgeons (4)

The component separation technique not only allows the repair of the hernia defect, but also the displacement of this large volume into the abdominal cavity. Ventral hernias should not be merely regarded as defects that require surgical repair, and active functions of the abdominal wall should also be restored in conjunction with the repair. Also the disconnected right and left sides of the abdomen needs to be restored and a sudden increase should be avoided when the organ and intestinal content of the hernia sac is transferred back into the abdomen. In this regard, component separation technique allows the fulfillment of all main four targets of hernia repair surgery defect is repaired, an active connection is achieved between the two

sides of the abdomen, dynamic functions of the abdomen are restored, and also potential problems associated with increased abdominal volume are minimized. Component separation technique allows successful back transfer of the hernia content by increasing the intra-abdominal volume. In this regard, a ventral hernia should be viewed as a dynamic abdominal wall disorder rather than a hole that requires repair.

Despite the high incidence of ventral abdominal hernias, no consensus exists regarding the ideal method to be used for the closure of the abdominal wall. The recurrence rate in primary repair range between 24% and 54%, and although patch repair reduces recurrence rates, synthetic patches may be associated with certain morbidities (6,7) The component separation technique seems particularly suitable in patients with massive abdominal defects, incision site infections, pathologies requiring concomitant intestinal surgery, or in those with previous incisional hernia repair.<sup>3</sup> This procedure allows innervated midline tissue repair by releasing external oblique muscles and fascia bilaterally, with a consequent displacement of the rectus muscles in the medial direction. Component separation technique restores the abdominal wall anatomy and function without increasing intra-abdominal pressure and elevating the diaphragm, and it also

eliminates the space loss due to hernia, gaining volume for the organs (5). It also regulates the intra-abdominal pressure and repairs the huge ventral hernia.

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### **Kaynaklar**

1. Agnew SP, Small W, Jr., Wang E, Smith LJ, Hadad I, Dumanian GA. Prospective measurements of intra-abdominal volume and pulmonary function after repair of massive ventral hernias with the components separation technique. *Annals of surgery*. 2010; 251(5): 981-8.
2. DuBay DA, Choi W, Urbanek MG, Wang X, Adamson B, Dennis RG, et al. Incisional herniation induces decreased abdominal wall compliance via oblique muscle atrophy and fibrosis. *Annals of surgery*. 2007; 245(1):140-6.
3. Ramirez OM, Ruas E, Dellon AL. "Components separation" method for closure of abdominal-wall defects: an anatomic and clinical study. *Plastic and reconstructive surgery*. 1990; 86(3): 519-26.
4. Saulis AS, Dumanian GA. Periumbilical rectus abdominis perforator preservation significantly reduces superficial wound complications in "separation of parts" hernia repairs. *Plastic and reconstructive surgery*. 2002; 109(7): 2275-80.
5. Rohrich RJ, Lowe JB, Hackney FL, Bowman JL, Hobar PC. An algorithm for abdominal wall reconstruction. *Plastic and reconstructive surgery*. 2000; 105(1): 202-16; quiz 17.
6. Anthony T, Bergen PC, Kim LT, Henderson M, Fahey T, Rege RV, et al. Factors affecting recurrence following incisional herniorrhaphy. *World journal of surgery*. 2000; 24(1):95-100; discussion 1.
7. Leber GE, Garb JL, Alexander AI, Reed WP. Long-term complications associated with prosthetic repair of incisional hernias. *Arch Surg*. 1998; 133(4):378-82.

