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A stretched fibrous cord like medial umbilical ligament in a child: Is it a reason for lower abdominal pain?

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Abstract: Obliterated umbilical arteries called as medial umbilical ligament (MUL) located in umbilicovesical fascia. In English literature, pathologies associated with anatomical variations of MUL have not been described. We present a 7-year-old male patient admitted with chronic colic lower abdominal pain and left non-palpable testis. Laparoscopic exploration showed a significant stretched fibrous cord like MUL with a peritoneal web on the both sides. The both ligaments were totally excised. Orchidopexy was performed for the left intraabdominal testis. The patient was pain free in the second year of follow up. Since there is a cross-neural sensitization among pelvic structures, a significantly tense MUL might be considered as a pathology causing recurrent abdominal pain by stretching and innervating the sensory neural fibers. Laparoscopy easily exposes if there is a stretching web like MUL from umbilicus to the pelvis. During an exploration for chronic abdominal pain with unknown etiology, if a significant pathology could not be identified, pain related to a tense fibrous MUL might be considered in the differential diagnosis.
Keywords: Medial umbilical ligament, Abdominal pain, Nonpalpable testis, Laparoscopy, Abdominal wall, Child

Bir çocukta gerilmiş fibrotik kord benzeri medial umbilikal ligament: Alt karın ağrısının bir nedeni midir?

Özet: Umbilikovesikal fasyada bulunan oblitere umbilikal arterler medial umbilikal ligamenti(MUL) oluşturur. Literatürde, MUL'un anatomik varyasyonları ile ilişkili patolojiler açıklanmamıştır. Bu çalışmada 7 yaşında, kronik, kolik tarzda alt karın ağrısı ve sol ele gelmeyen testis ile başvuran olgu sunuldu. Laparoskopik incelemede, gergin fibrotik bant benzeri, peritoneal katlantı oluşturan bilateral MUL izlendi. Her iki ligaman tamamen eksize edildi. Sol intraabdominal testis için orşidopeksi yapıldı. Hasta izlemin ikinci yılında ağrısızdı. Pelvik yapılar arasında çapraz sinirsel duyarlılık olduğu için, belirgin bir şekilde gerilen MUL, duyusal sinir liflerini gererek ve uyararak tekrarlayan karın ağrısına neden olan patolojilerden biri olarak düşünülebilir. Umbilikustan pelvise uzanan MUL benzeri pelvik katlantılar laparoskopi ile kolayca ortaya konabilir. Etiyolojisi bilinmeyen bir kronik karın ağrısı araştırması sırasında, eğer önemli bir patoloji tanımlanamadıysa, ayırıcı tanıda gergin fibrotik MUL düşünülebilir.
Anahtar Kelimeler: Medial umbilikal ligament, Karın ağrısı, Ele gelmeyen testis, Laparoskopi, Karın duvarı, Çocuk

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INTRODUCTION

Medial umbilical ligament (MUL) is an obliterated umbilical artery. It is symmetrically located on the both sides of the lower abdominal wall in umbilicovesical fascia. It traverses between the median umbilical ligament (urachus) and lateral umbilical ligament (inferior epigastric vessels) on both sides [1].

In this case report, we present a patient having chronic colic abdominal pain and a left side nonpalpable testis. Laparoscopy showed stretched fibrous cord like MUL that might be related to abdominal pain.

CASE REPORT

A 7-year-old male patient was admitted with recurrent abdominal pains. He had colic lower abdominal pain attacks with irregular interval since the last 6 months. There were no other associated complaints. Physical examination and laboratory investigation including both blood and urine analysis did not give any specific data for differential diagnosis of the pain. Direct abdominal X-ray and ultrasound did not show any specific pathology. Only positive finding we determined during physical examination was a retractile right testis and a nonpalpable left testis. Laparoscopy was planned for diagnostic exploration of chronic abdominal pain and nonpalpable left testis.

To find the etiology of the abdominal pain, laparoscopic exploration was performed to determine any pathology related to the appendix, intestines and other abdominal organs; and also any pathology that might be associated with the pain such as abdominal wall and inguinal hernias, mass, and malrotation were investigated. The only abnormal finding was a significant stretched fibrous cord like MUL with a peritoneal web on the both sides (Fig 1). The stretching ligaments were applying a traction force to the urinary bladder, ductus deferens and to the intrapelvic origin of the ligament. The left testis was intraabdominal.

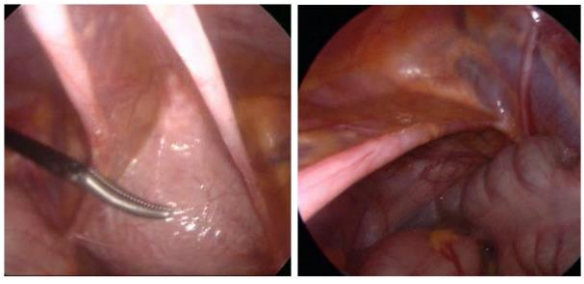

Figure 1. Stretched fibrous cord like MUL with web formation

The term “web” is for describing the peritoneal membrane located between stretching MUL and peritoneal surface of anterior abdominal wall. Since there is a cross-neural sensitization among pelvic structures, this type of ligament formation

was considered as a pathology that might be causing recurrent abdominal pain by stretching and innervating the sensory neural fibers of the neighboring structures. Ligaments were totally excised on the both sides. By excision, traction on the pelvic structures was released.

Following excision of the ligament, left orchidopexy was performed. The excision of the ligament facilitated mobilization of the left testis and ductus deferens for orchidopexy. The patient did well postoperatively and he is pain free in the second year of follow up.

DISCUSSION

There are few studies investigating the anatomy and clinical importance of ligamentous structures of the anterior abdominal wall in English literature [2-4]. In open surgery, depending on the place and size of the incision, in most cases, it wouldn't be possible to see and identify clearly these ligaments. Laparoscopy provides an exploration of inner side of the abdominal wall with details so that any anatomical variation and a pathology associated with these structures could be observed.

Internal iliac artery gives a branch called patent umbilical artery which continues preperitoneally as MUL (obliterated umbilical artery). In male, ductus deferens crosses MUL before getting into the deep inguinal ring, and testicular and inferior epigastric vessels are located on lateral of MUL [5].

To know the anatomy and anatomical variations of anterior abdominal wall is highly important for surgeons performing laparoscopy. Depending on the degree of stretching, this fibrotic ligament may form a peritoneal web like membranous structure on abdominal wall. A MUL with a fibrous cord and significant web may cause technical difficulties and also narrow the working space in laparoscopic surgery. Anatomical variations may also affect the surgeon's preference on trocar locations [4].

MUL has a close relation with organs and structures of the lower abdomen. Close proximity of visceral organs within the abdominal cavity complicates identification of the exact source of chronic pelvic pain. Cross-sensitization among pelvic structures may contribute to chronic pelvic pain of unknown etiology. The cell bodies of sensory neurons projecting to the colon, urinary bladder and male/female reproductive organs express a wide range of membrane receptors and synthesize many neurotransmitters and regulatory peptides. These substances are released from nerve terminals following enhanced

neuronal excitability [6]. Factors such distention, stretching and muscular contraction of the abdominal viscera and structures may cause visceral pain. Hindgut structures like distal colon and urinary bladder cause lower abdominal pain. A fibrous cord like MUL, as in our case, may cause pain by stretching ductus deferences, urinary bladder and other related structures. As we observed in iatrogenic distension caused by insufflation, a tense ligament may come out at the time of abdominal fullness and distension.

The mechanism of the round ligament pain during pregnancy helps us to understand the pain caused by a stretched fibrous MUL [7, 8]. During pregnancy, uterus enlarges and stretches the round ligaments. This stretching force causes visceral pain by neuronal excitability of related pelvic structures [6].

Since our patient also had a nonpalpable testis, a question may arise, asking whether an association of nonpalpable testis and stretched fibrous MUL is present or not. As a speculation, a stretching MUL might be associated with nonpalpable testis. During prenatal descent of the testes, the processus vaginalis herniates through the abdominal wall along the path formed by the gubernaculum and it carries extensions of the layers of the abdominal wall before it, which form the walls of inguinal canal, the covering of the spermatic cord and testis [9]. MUL is the obliterated umbilical artery; since the umbilical arteries are located just under the abdominal wall, it may be speculated that if the umbilical artery of the fetus is relatively short and fibrous, it may interrupt the descent of testis during the descensus of abdominal wall muscles. This is just a speculative hypothesis. Since there is no significant support for such hypothesis in English literature, this case report alone is not enough to make a definitive conclusion. But we may suggest that excision of web forming fibrous cord like ligament at the side of intraabdominal testis would facilitate mobilization of testis and ductus for orchidopexy.

Prospective studies should be designed to investigate the clinical significance of a stretching MUL, especially in patients having abdominal pain with unknown origin and patients with nonpalpable testis.

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