The value of Multislice CT in the evaluation of abdominal wall hernias

Essay

submitted for partial fulfillment of the master degree in radiodiagnosis

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2010


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Introduction

Introduction

Multislice computed tomography(MSCT) is a form of computed tomography imaging where a number of slices is obtained in the same time frame,rather than the traditional single slice sequentially or helical slices.It has modified the imaging approach for assessment of many diseases**.(Dewey et al,2007)**

Abdominal wall hernias are the protrusion of tissue or an organ through a defect or weakness in the surrounding wall.It occurs when the contents of a body cavity bulge out of the area where they are normally contained.It may be present at birth and is considered to be congenital ,developed spontonously over time or occurs as a result of trauma or surgery.There are areas on the abdominal wall which are prone to hernia formation,these areas are the epigastric region where the epigastric hernia develop, the inguinal region,the site of inguinal hernia and the umbilical region, the site of umbilical hernia .Also, iatrogenic hernia may occur at sites of surgical incisions and known as incisonal hernia& Sigelian hernia which occur along the edge of rectus abdominus muscle**(Prector et al 2009).**

Abdominal wall hernias are usually asymptomatic but may be complicated by strangulation,incarceration,bowel obstruction or even post surgical complications like;infected or non infected fluid collection and complications related to the prosthetic material used in the repair which all need early detection and emergency surgery. ***(Baleato et al,2009)***

Multi-slice computed tomography is currently the study of choice to diagnose abdominal wall hernias and to assess the possible complications due to its multiplanar capabilities which shows the anatomical details of abdominal wall. **(Strange et al 2008)**

It also allows accurate identification of wall hernias and their content,differentiation of hernia from other abdominal masses like:(tumours,haemtoma,abscess) and detection of pre or post operative complications, it can also suggest comprmised blood supply. All these findings are essential for making the correct diagnosis and help also in clinical management by guiding clinicians to choose the correct treatment plane. **(Diego et al,2005)**

Aim of the Work

The aim of work

This essay is designed to clarify the role of multislice CT in the evaluation of abdominal wall hernias by accurately detecting their types&contents, localizing their sites and early detection of their complications.

CT anatomy of the antero lateral abdominal wall.

Anatomy of the antero lateral abdominal wall

In human anatomy,the antero lateral abdominal wall consists of **3 main layers**; 1-external layer

2- Internal layer

3- innermost layer.

The outer most layer of the abdominal wall is the skin and just underneath the skin is the abdominal wall fascia which is divided into two layers:superficial fatty layer and deep membranous layer.The inner layer of the abdominal wall is the abdominal wall muscles.***(Shakeeb et al,2010).***

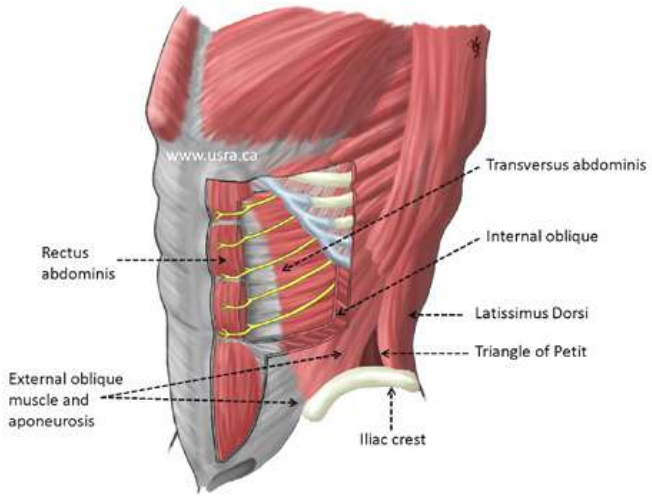

Figure (1):Muscles of the anterolateral abdominalwall **(McDonnell et al,2007)**

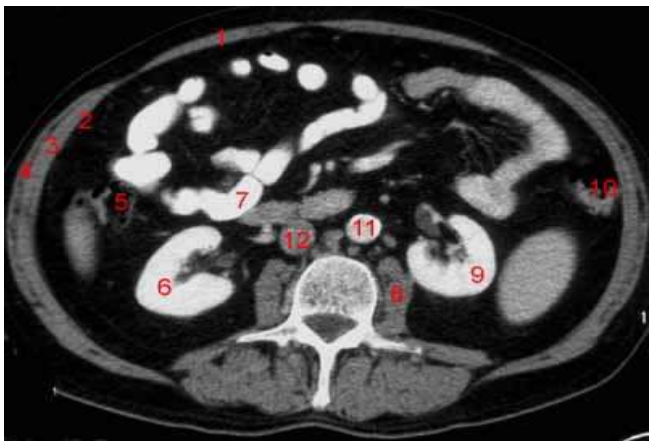

Figure (2) :Axial CT of the anterior abdominal wall. (**ÖZTOPRAK et al,2009)**

1-Rectus abdominus muscle 2-Transversus abdominus muscle

3-Internal oblique muscle 4-External oblique muscle

5-Ascending colon 6-Right kidney

7-Third part of duodenum 8-Left psoas muscle

9-Left kidney 10-Desending colon

11-Aorta 12-Inferior vena cava

The superficial fascia:

The superficial fascia of the abdomen consists of a single layer containing a variable amount of fat;but near the groin it is easily divided into two layers:

1-Campers fascia 2-Scarpas fascia.

between which are found the superficial vessels and nerves and the superficial inguinal lymph nodes**.(Ahluwalia et al,2009)**

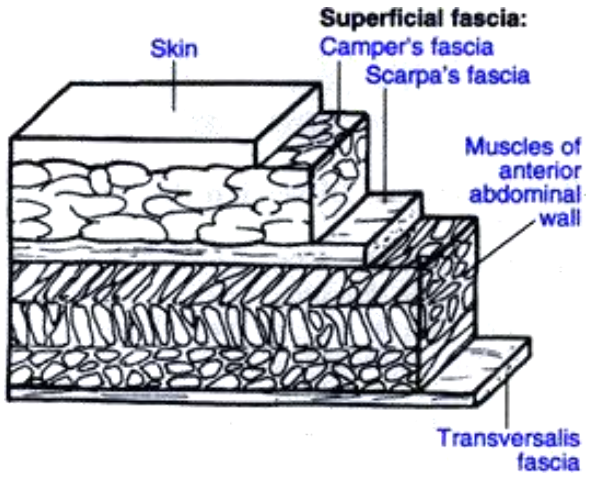

Figure (3):
Layers of the anterior abdominal wall**(Williams,et al,1995)**

The superficial layer of superficial fascia (fascia of camper):

- Is thick,areolar in textures and contain in its meshes a varying quantity of adipose tissues.
- Below,it passes over the inguinal ligaments,and is continous with the superficial fascia of the thigh.
- In male,campers fascia is continued over the penis and outer surface of spermatic cord to the scrotum,where it helps to form the dartos muscle.

As it passes to the scrotum it changes its characterstics, becoming thin,destitute of adipose tissue, of pale reddish colour and acquire some involuntary muscular fibers.

From the scrotum, it may be traced backward into continuity with the superficial fascia of perineum. In females ,campers fascia is continued from the abdomen into the labia majora**.(Grants et al,2009)**

The deep layer of superficial fascia (fascia of scarpa):

- Is thicker and more membranous in charachter than the superficial,and contains a considerable quantity of yellow elastic fibers.

-It is loosely connected by areolar tissue to the aponeurosis of the oblique externus abdominus,but in the mid line it is more intimately adherent to the linea alba and to the symphesis pubis,and is prolonged on to the dorsum of the penis,forming the fundiform ligament.

-Above,it is continous with the superficial fascia over the rest of the trunk:below and laterally,it blends with the fascia lata of the thigh a little below the inguinal ligament;medially and below,it is continued over the penis and spermatic cord to the scrotum,where it helps to form the dartos muscle.

-From the scrotum, it may be traced backwards into continuity with the deep layer of the superficial fascia of the perineum(fascia of Colles).

-In females,it is continued into the labia majora and hence to fascia of Colles.**(David et al,1937)**

-The antero lateral muscles of the abdomen are:external oblique muscle,internal oblique muscle ,transversus abdominus muscle,rectus abdominus muscle and pyramidalis muscle which may be abscent.

1-The Oblique Externus muscle:

-SITE: Broad and flat muscle situated on the lateral and anterior parts of the abdomen ,It is the outer most muscle covering the side of the abdomen.

-Origin:arises by muscular slips from the outer surfaces of the lower 8 ribs from ribs(5-12),Its upper fibers of origin interdigitate with serratus anterior muscle while latissimus dorsi muscle is associated with the lower fibers of origin.

-Direction of fibers: they curve down and forward towards its insertion

-Insertion:The lateral lip of iliac crest.**(Elizabeth,2009)**

2-The Oblique Internus muscle:

-SITE:It is the middle layer of the lateral group of the musculoaponeurotic complex. .It is smaller and thinner than the oblique externus ,beneath which it lies.

-**Origin:**It arises from thoracolumbar fascia,anterior two thirds of iliac crest and the lateral two thirds of the inguinal ligaments. **Insertion**:It is inserted into the inferior border of the lower 3 or 4 ribs, linea alba,pubic crest and pectineal line.The aponeurosis of the internal oblique above the level of the umbilicus splits to envelop the rectus abdominus muscle then reforming in the mid line to join the fibres of the linea alba**.(Kapandji,1974)**

3-The Transversus abdominus muscle;

- **Site:** So called from the direction of its fibers.It is flat,triangular with its fibers running horizontally being placed immediately beneath the oblique internus.

- **Origin**:It arises by fleshy fibers from thoracolumbar fascia,medial lip of iliac crest,lateral third of jnguinal ligament and inner surfaces of the costal cartilage of the lower 6 ribs (7-12).

-**Insertion**:The muscle ends in a broad aponeurosis,the lower fiber of which curve downward and medially and are inserted together with those of the oblique internus into pubic crest and pectineal line.Throughout the rest of its extent the aponeurosis passes horizontally to the middle line and is inserted into the linea alba;Its upper three-fourth lie behind the rectus and blend with the posterior lamella of the aponeurosis of the oblique internus and its lower fourth is in front of the rectus**.(Douglas et al,1890)**

4-The Rectus abdominus:

Site:It is a long and flat ms,which extend along the whole length of the front of the abdomen,and is separated from its fellow of the opposite side by linea alba.It is much broader ,but thinner,above than below.

- **Origin**: It arises by two tendons;The lateral or larger is attatched to the crest of the pubis,the medial interlace with its fellow of the opposite side,and is connected with the ligaments covering the front of the symphysis pubis.

- **Insertion**:The muscle is inserted by three portions of unequal size into the costal cartilages of the fifth,sixth and seventh ribs,some fibers are occasionally connected with the costoxiphoid ligaments, and the side of the xiphoid process.

The rectus is crossed by fibrous bands,three in number,which are named the tendinous intersections:one is usually situated opposite the umbilicus,one at the extremity of the xiphoid process,and the third midway between the umbilicus and the xiphoid process.

These intersections pass transversely or obliquely across the ms in a zigzag course,they rarely extend completely across its substance and may pass only halfway across it.They are intimately adherent in front to the sheath of the muscle**. (** ***Andrew*** **et al,2005)**