Management of Ventral Hernias in Patients with Chronic Liver Disease

Essay

Submitted for Partial Fulfillment of Master Degree

in General Surgery

By

Mazen Mahmoud Mohammed Hasan

M.B.,B.CH

Under Supervision of

Prof. Dr. Hassan Zakaria Shaker

Professor of General Surgery

Faculty of Medicine – Ain Shams University

Prof. Dr. Ahmed Hazem I. Helmy

Professor & Head of the Department of General Surgery

Theodor Bilharz Research Institute

Dr.Sherif AbdelHalim Elmaghrabi

Lecturer of General Surgery

Faculty of Medicine – Ain Shams University

Faculty of Medicine
Ain Shams University
2011

معالجة فتق جدار البطن الأمامي للمرضي المصابون بأمراض الكبد المزمنة

رسالة

توطئة للحصول على درجة الماجستير
في الجراحة العامة

مقدمة من

الطبيب/ مازن محمود محمد حسن
بكالوريوس الطب والجراحة

تحت إشراف

أ.د/ حسـن زكريـا شاكـر
أستاذ الجراحة العامـة
كلية الطب - جامعة عين شمس

أ.د/ أحمـد حازم ابراهيم حلمي
أستاذ و رئيس قسم الجراحة العامـة
معهد تيودور بلهارس للأبحاث

د/ شريف عبد الحليم المغربي
مدرس الجراحة العامـة
كلية الطب - جامعة عين شمس

كلية الطب
جامعة عين شمس
٢٠١١

Acknowledgement

First greatest thanks are due to ***Allah****,*
the Most Beneficent and Merciful.

I particularly want to thank ***Prof. Dr. Hassan Zakaria shaker,*** *Professor of general surgery, Ain Shams University for his generosity in allowing me to search in this interesting subject and for his kind guidance and supervision.*

My sincere gratitude goes also to ***Prof. Dr. Ahmed Hazem I. Helmy****, Professor and chairman of General Surgery, Theodor Bilharz Research Institute for his great effort in completing the practical part and revision of this essay, which in fact is a continuation of his researches.*

I acknowledge the helpful and the supportive contribution of ***Dr. Sherif Elmaghrabi****, Lecturer of General Surgery, Ain Shams University, Because of his endless patience, the time he provided for this work, despite his busy schedule, his great and vital contribution brought this work into fruition. For him I will remain deeply grateful.*

My deepest thanks also extend to ***Prof. Dr.Sobhy Kishta*** *Professor of General Surgery, Theodor Bilharz Research Institute &* ***Dr. Ahmad Abdelaziz*** *Lecturer of General Surgery, Theodore Bilharz Research Institute, for their proficient gentleness in assisting me.*

I would like to thank all my colleagues for their continuous help and support.

Last but not least, I would like to thank all my patients for their help.

I would like to dedicate this Essay to my Father *&* Sunshine Mother*; and my grandmother to them I will never find adequate words to express my gratitude.*

Also to my beloved family*, for dealing so patiently, tactfully during this work*

Contents

Page No.

Introduction.....1

Aim of work.....5

Chapter (1): Embryology of the abdominal wall 6

Chapter (2): Anatomy & Physiology of the anterior abdominal wall 8

Chapter (3): Chronic liver diseases 31

Chapter (4): Classification of Primary Abdominal Wall Hernias 33

Chapter (5): Umbilical Hernia.....35

- Types and Classification 35
- Incidence and Etiology.....35
- Diagnosis.....38
- Preoperative Preparation 43
- Principles of repair and Precautions.....58
- Operative Technique 66
- Laparoscopic Repair.....91
- Postoperative Care 96
- Postoperative Complications of Hernia Repair..... 97

Summary and conclusion 115

References.....118

Arabic summary.....–

List of tables

Page No.

Table (1): European Hernia Society classification for primary abdominal wall hernia 34

Table (2): Child's classification.....47

Table (3): Modification of Child's Classification by Pugh's Classifications.....49

Table (4): Classification of Reinforcing Materials for Hernia repair 81

Table (5): Types and Characteristics of Prosthetic Materials Used in Hernia Repair 84

List of figures

Page No.

Fig. (1): The umbilicus 7

Fig. (2): Anterior view of the abdominal wall (26 year's old male) 9

Fig. (3): Anterior view of the abdominal wall (24 year's old female) 9

Fig. (4): Anterior abdominal wall muscles 16

Fig. (5): Anterior abdominal wall muscles 18

Fig. (6): Section above the arcuate line 21

Fig. (7): Section below the arcuate line 21

Fig. (8): Right midinguinal region 25

Fig. (9): The right inguinal space 25

Fig. (10): Exomphalos 38

Fig. (11): Infantile umbilical hernia 40

Fig. (12): Large paraumbilical hernia. 41

Fig. (13): Umbilical hernia in ascitic patient. 42

Fig. (14): Mayo's operation for umbilical hernia. 66

Fig. (15): Stone's modification of the Mayo's operation for umbilical hernia. 68

Fig. (16): Medium-sized umbilical hernia. A: Exposure of the fascial edge of the hernial defect and of the neck of the sac. 72

Fig. (17): Medium-sized umbilical hernia. B: radial incision of the sac. 72

Fig. (18): Medium-sized umbilical hernia. C: The incision in the neck of the sac 72

Fig. (19): Medium-sized umbilical hernia. D: Continuous mass closure of hernial opening. 72

Fig. (20): Medium-sized umbilical hernia. E: Onlay mesh-graft reinforcement of repair 73

Fig. (21): Medium-sized umbilical hernia. F: Onlay darn reinforcement of repair 73

Fig. (22): Medium-sized umbilical hernia. G: Combined onlay darn and mesh-graft reinforcement 73

Fig. (23): Underlay graft.....88

Fig. (24): Overlay graft.....88

Fig. (25): Combined underlay and overlay graft 88

Fig. (26): Combined large overlay and underlay graft 88

Fig. (27): Large overlay grafts.....88

Fig. (28): Large underlay graft 88

Fig. (29): Sandwich Technique: Wrap-around mesh reinforcement of wound edges 88

Fig. (30): Two sheets of mesh sutured to abdominal wall, then sutured to each other to draw together the edges of the wound 88

Fig. (31): Strangulated umbilical hernia.....90

Fig. (32): Port placement. 95

Fig. (33): Reduction of hernia contents. 95

Fig. (34): Sizing of hernia defect with 27-gauge spinal needle. 95

Fig. (35): Tying of trans-fascial sutures in subcutaneous tissues. 95

Fig. (36): Tacking of mesh. 95

Introduction

Patients with chronic liver disease are at high risk for morbidity and mortality due to stress of surgery and effects of general anesthesia, however surgery for chronic liver disease patients is not contraindicated as certain types of surgery can be undertaken safely if patients are evaluated and managed carefully. Child class C cirrhosis is a relative contraindication to elective surgery; as such patients are likely to develop postoperative complications and mortalities ***(Lu et al., 2006).***

Management of ventral hernias in the setting of chronic liver disease has unique and specific problems due to the pathophysiology of Liver disease. The high intra-abdominal pressures generated by ascites when applied to areas of partial weakness are the cause of hernia formation and enlargement. Umbilical rupture and hernia strangulation are the most common life-threatening complications of umbilical hernia with ascites and they demand urgent surgical intervention ***(Loriau et al., 2002).***

Elective repair of a ventral hernia in a patient with chronic liver disease is more likely to be successful if the ascites is controlled and the patient's nutritional status and hepatic reserve are optimized preoperatively ***(Podymow et al., 2003).***

Umbilical hernia is the most common type of ventral hernias in patients with chronic liver disease. The prevalence of

umbilical hernia in cirrhotic patients with ascites is up to 20%. ***(De la Pena et al., 2000).***

The most common complications of umbilical hernias in patients with cirrhosis and ascites include leakage, ulceration, rupture and incarceration. If such a complication is present, there is a high mortality rate after surgical repair. Elective repair is the most effective choice, as it prevents complications with a lower mortality. However, the control of ascites before and/or after repair is mandatory but may not always be possible with diuretics and paracentesis. Portal decompression by transjugular intrahepatic portosystemic shunt (TIPS) may be needed ***(Triantos et al., 2010).***

Techniques for the repair of Umbilical hernia in adults evolved during the past century but no consensus has been reached regarding the best procedure. The Mayo's repair, first described by James Mayo in 1901 ***(Lau et al., 2003)*** and its alterations could not stand the test of time as recurrence rate of 20% and even higher is not acceptable for any surgical procedure ***(Muschaweck et al., 2003).***

Stone (1926) pointed out that, in Mayo's procedure the potential weak areas, one at each end of the overlapping suture line may be the site of future recurrence. He modified the Mayo's procedure by approximating the upper and lower margin of the fascial defect with a two parallel layers of interrupted mattress sutures of silk.

Vincze et al. (1991) did hernioplasty in cirrhotic patients with one way ascitic-valve implantation. They stated that it can be performed together at the same sitting with good results.

Kishta et al. (2004) stated that the triple layers herniorrhaphy (Modified Stone's Repair) for umbilical hernia can be done safely by local anesthesia in cirrhotic patients with and without ascites as these patients have flabby lax abdominal wall and good tolerance to local anesthesia.

Mesh repair has become a standard procedure for the treatment of hernias. Mostly due to lowered recurrence rates which put the procedure as an integral component in hernia surgery ***(Klinge et al., 2002).***

Others conclude that the evidence-base is sufficiently strong to recommend that all defects in the abdominal wall, whether inguinal, incisional or umbilical hernias, and of whatever size, should be repaired with the use of prosthetic mesh ***(Vrijland et al. 2003).***

However, the prosthetic repair of umbilical hernia has the disadvantages of intense foreign body reaction. It is associated with a higher inflammatory response compared to suture techniques ***(Di et al., 2000)*** and wound infection as bacteria can be trapped in fibrotic tissue, with the risk of delayed wound infection ***(Debodinance et al., 2002).*** The only way to cure the late infection in the hernia repaired by mesh is to remove the implanted mesh again to eradicate infections ***(Chen-Min, 2000).***

Giuilio et al. (2006) observed that though open repair in cirrhotic patients has significant recurrence rates and frequent wound infection, laparoscopic repair of ventral hernia yields less morbidity and fewer recurrences, the study highlighted that the preservation of anterior abdominal wall in laparoscopic repair avoids the interruption of collateral veins which aren't infrequently distended in cirrhotic patients.

Hilling et al. (2009) have developed a new laparoscopic approach that places the mesh in the preperitoneal space.

Aim of the Work

The aim of this study was to populate elective Ventral hernia repair in patients with chronic liver disease which minimizes the risk of perioperative morbidity and mortality when done on elective basis giving enough time to control ascites and to improve the nutritional status of the patient.

Chapter (1):
Embryology of the Abdominal Wall

Formation of the Anterior Abdominal Wall Muscles:

During the fifth week, the myotomes become divided into a small posterior part, the epimere and larger anterior part, hypomere. Each segmental spinal nerve is also divided into posterior primary ramus that innervates the epimere and anterior primary ramus that supplies the hypomere. The epimere gradually develop into the extensor muscles of the vertebral column, while the hypomeres form the prevertebral flexor muscles of the vertebral column ***(Bardeen and Leuis, 1901).***

In the abdomen, the mesenchyme fuses to form large sheets of muscle. Narrow anterior portion becomes separated from the somatopleuric mesenchyme which in the abdomen forms the rectus abdominis and pyramidalis muscles. The rectus abdominis retains indications of its segmental character, as seen by the presence of tendinous intersection. Second, the anterolateral parts of the somatopleuric mesenchyme become split tangentially into three layers, which in the abdomen form the external oblique, internal oblique and transversus abdominis muscles ***(Boyd, 1980).***

The anterior body wall is finally closed in the midline at three months of the intra-uterine fetal life by the right and left sides meeting in the midline and fusing. In the abdomen the line of fusion of the mesenchyme forms the linea alba. The muscle of the diaphragm is derived from the septum transversum in the thorax developed from 3^{rd}, 4^{th}, and 5^{th} cervical myotomes ***(Bardeen et al., 1901).***

Concurrently the connection of midgut with the yolk sac is reduced to narrow yolk stalk which is composed of extra-embryonic mesoderm, intra-embryonic rnesoderm, allantois and umbilical arteries and veins after folding the region of attachments of the amnion to the embryo is reduced to relatively narrow umbilical region on he ventral surface ***(Keith, 1988).***

As the amniotic cavity expands, it leads to great shrinkage of the yolk sac with elongation of the vitello-intestinal duct. So the cord elongates with obliteration of the extra-embryonic coelom except for limited space that is left close to the umbilical orifice where midgut loop herniation occurs through it ***(Nieuwkoo, 1985).***

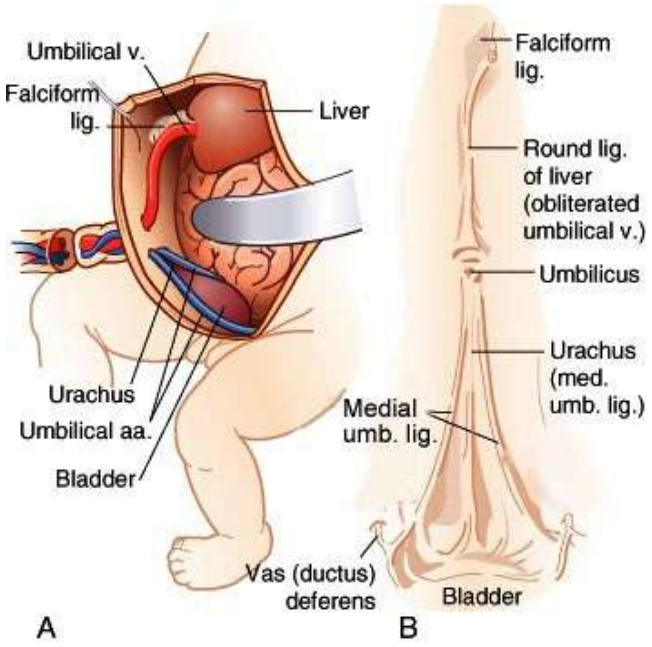

Fig. (1): The umbilicus. (A) In the fetus, the umbilical vein superiorly and the two umbilical arteries and urachus inferiorly radiate from the umbilicus. (B) A view of the umbilicus from within the peritoneal cavity showing the round ligament of the liver superiorly and the median umbilical ligament and medial umbilical ligaments ***(Towsend et al. 2004).***