



True Umbilical versus Open Hasson Technique Access for Pneumoperitoneum in Laparoscopic Cholecystectomy

Thesis

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By

Rami Hassan Mohammed Hassan

M.B.B.Ch

Resident of Surgery at Theodor Bilharz Research Institute

Supervised By

Prof. Dr/ Khaled Zaky Mansour

Professor of General Surgery

Faculty of Medicine – Ain Shams University

Prof. Dr/ Ahmed Hazem Ibrahim Helmy

Professor of General Surgery

Theodor Bilharz Research Institute

Dr/ Mohamed Ahmed Rady

Assistant Professor of General Surgery

Faculty of Medicine – Ain Shams University

Dr/ Ahmed Fouad Emam

Lecturer of General Surgery

Faculty of Medicine –Ain Shams University

Faculty of Medicine - Ain Shams University

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بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

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List of Abbreviations

Abb.	Full term
ALP	<i>Alkaline phosphatase</i>
BES	<i>Biliary endoscopic sphincterotomy</i>
CBD	<i>Common bile duct</i>
CBDS	<i>Common bile duct stones</i>
CHD	<i>Common hepatic duct</i>
CT	<i>Computed tomography</i>
ERC	<i>Endoscopic retrograde cholangiography</i>
ERCP	<i>Endoscopic retrograde cholangiopancreatography</i>
EUS	<i>Endoscopic Ultrasound</i>
GGT	<i>Serum gamma glutamyl transpeptidase</i>
HDL	<i>High-density lipoprotein</i>
HIDA	<i>Hepatobiliary iminodiacetic acid</i>
IOC	<i>Intraoperative Cholangiography</i>
LC	<i>Laparoscopic cholecystectomy</i>
LFTs	<i>Liver function tests</i>
LHD	<i>Left hepatic duct</i>
MRCP	<i>Magnetic Resonance Cholangiopancreatography</i>
PTC	<i>Percutaneous Transhepatic Cholangiography</i>
RHD	<i>Right hepatic duct</i>
TPN	<i>Total parenteral nutrition</i>
TUS	<i>Transabdominal ultrasound</i>

INTRODUCTION

Laparoscopic cholecystectomy has become the gold standard in the treatment of symptomatic gall stones, the major advantages of laparoscopic cholecystectomy include less postoperative pain, less time required for hospitalization and recovery, and better cosmetic results (*Terho et al., 2016*).

The placement of the first trocar remains a critical step in laparoscopic cholecystectomy and in order to minimize complications associated with placement of this first trocar as vascular and intestinal injuries, several techniques have been reported (*Karaca et al., 2014*).

Two common methods are usually performed; The first called the closed technique, requires the Veress needle, which is inserted in the abdominal cavity for carbon dioxide (Co₂) insufflations followed by blind introduction of the first trocar; The second called open technique was first described by Hasson (*Ahmad et al., 2015*).

Open Hasson technique begins with a small incision c-shaped below the umbilicus and subsequently all layers of the abdominal wall are incised, the first trocar is inserted under direct vision followed by gas insufflations (*Lal et al., 2012*).

Some prefer True umbilical technique because they feel that it gives a better visual control, through natural opening and which is simple, easy, feasible, safe, excellent functional and cosmetic results (*Slater and Pimpalwar, 2013*).

AIM OF THE WORK

The aim of this study is to compare True Umbilical versus Open Hasson technique access for pneumoperitoneum in Laparoscopic Cholecystectomy as regards Timing, Cosmetic, Pain control and Complications.

ANATOMY OF THE ANTERIOR ABDOMINAL WALL

Embryology of anterior abdominal wall:

The development of the anterior abdominal wall depends on differential growth of embryonic tissues.

As the embryo grows, the yolk sac is divided into an intra-coelomic portion and an extra-coelomic portion.

The intra-coelomic portion becomes the primitive alimentary canal and communicates with the extra-coelomic portion through the vitelline duct, also known as the omphalo-mesenteric duct. This communication is lost at 5–7 weeks of gestation. Persistence of part or all of this connection results in omphalo-mesenteric anomalies (*Skandalakis et al., 1994*).

In the third week, the yolk sac develops a diverticulum called the allantois, which grows into the body stalk. As the distal hindgut and the urogenital sinus separate, the developing bladder remains connected to the allantois through a connection called the urachus. Persistence of the urachus or urachal tissue leads to urachal remnants. Subsequently, the yolk and body stalks fuse to become the umbilical cord. Development of the abdominal wall narrows the umbilical ring, which should close

before birth. Persistence of the ring results in an umbilical hernia. **Figure (1)**

Failure of the normal obliterative processes of the vitelline duct and the urachus leads to abnormal communications or cysts. Retention of components of the umbilical cord can also produce a mass or drainage (*Cappele et al., 2001*).

A patent umbilical ring at birth is responsible for most umbilical hernias. The umbilical opening is usually inferiorly reinforced by the attachments of the median umbilical ligament (the obliterated urachus) and the paired medial umbilical ligaments (obliterated umbilical arteries) and is more weakly superiorly reinforced by the round ligament (obliterated umbilical vein) **Figure (2,3)**

Richet fascia, derived from the transversalis fascia, covers the ring. The peritoneum covers the innermost portion of the ring (*Hayward et al., 1979*).

Variability in the attachment of the ligaments and the covering by Richet fascia may predispose some children to developing umbilical hernias **Figure (4)**. This fascia may completely or partially cover the umbilical ring or be completely absent. These variations predispose to umbilical hernia formation and are responsible for the range of defects

encountered clinically. It is important to note that many children undergo spontaneous closure in the first few years of life. The pressure exerted on the umbilical skin, even when only a small umbilical defect is present, can result in marked stretching of the skin and a proboscis appearance (*Novack et al., 1988*).

Masses of the umbilicus may be related to lesions of the skin, embryologic remnants or an umbilical hernia. Masses associated with the skin include dermoid cysts, hemangiomas, and inclusion cysts. Umbilical drainage is associated with granulomas and embryologic remnants. Failure of the normal physiologic processes results in postnatal disease. The umbilical cord separates from the umbilicus between 1 and 8 weeks postnatally. Topical antimicrobials are applied after delivery, followed by isopropyl alcohol until the cord separates. Delayed separation of the cord may signify an underlying immune disorder (*Wilson et al., 1985*).

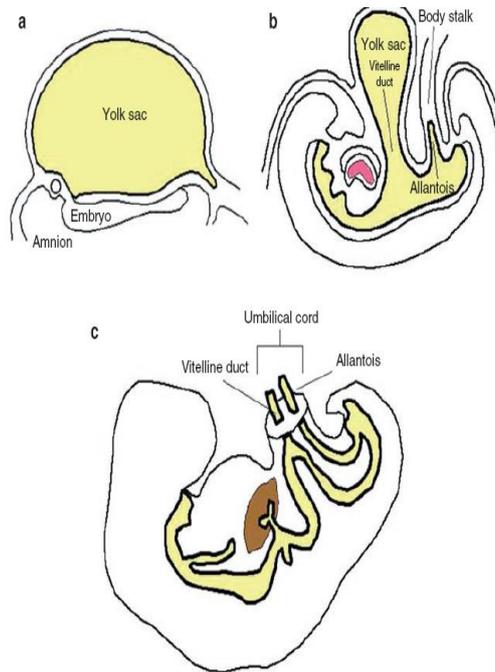


Figure (1): The developing umbilical cord. **(a)** Embryonic disk: At this stage, the ventral surface of the fetus is in contact with the yolk sac. **(b)** The yolk sac narrows as the fetus grows and folds. The intra-coelomic yolk sac forms the intestine and communicates with the extra-coelomic yolk sac through the vitelline duct. The vitelline duct is also referred to as the omphalomesenteric duct and the yolk stalk. The allantois has begun to grow into the body stalk. **(c)** The yolk and body stalks fuse to become the umbilical cord (*Skandalakis et al., 1994*).

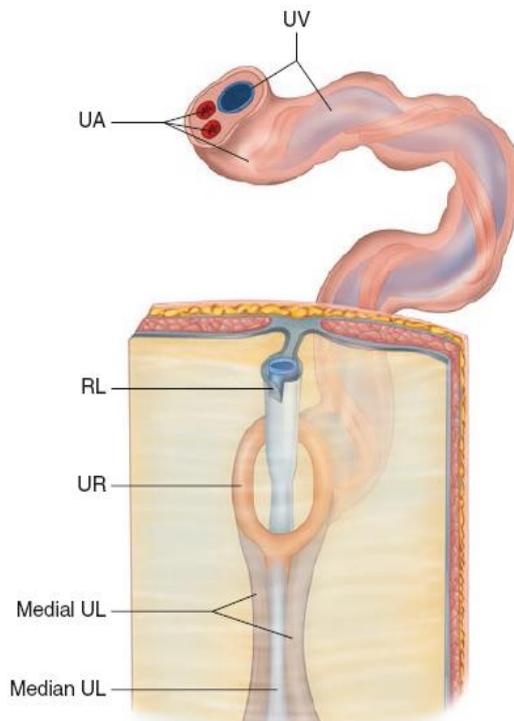


Figure (2): Umbilical region viewed from the posterior surface of the abdominal wall of an infant with the umbilical cord attached. UA umbilical artery, UV umbilical vein, RL round ligament (obliterated umbilical vein), UR umbilical ring, UL umbilical ligament, medial (obliterated umbilical arteries), median (obliterated urachus). Note fascial covering of surface and umbilical ring (*Minkes et al., 2014*).