INTRODUCTION

Acute abdomen is characterized by sudden appearance of abdominal complaints that oblige the surgeon to decide promptly whether to operate immediately, or to observe the patient [1-2].

Abdominal pain accounts for 5% to 10% of all emergency department visits or 5 to 10 million patient encounters in the United States annually[3]. Another study demonstrated that 25% of patients presenting to the emergency department complained of abdominal pain [4].

New diagnostic developments, such as ultrasonography & computed tomography (CT), it seems that acute abdominal condition present situations in which a surgeon cannot open an abdomen without a clear diagnosis, with the only exception of hemodynamic instability caused by abdominal condition[5].

After a full medical history, general &local examination, supplementary studies should be done including hematology, biochemistery & plain radiography of the abdomen. A clear diagnosis, if possible, is important to plan right abdominal incision or to avoid unnecessary laparotomy [1].

As non invasive procedure such as ultrasonography & C T, are not always conclusive, laparoscopy is the only technique which can visualize abdominal cavity and establish an adequate diagnosis [6].

Diagnostic laparoscopy is a safe and accurate procedure that enables laparoscopic interventions and helps avoid non-therapeutic surgery. Diagnostic laparoscopy and appropriate treatment reduces hospital stay, therapeutic delay, and convalescence time [7].

AIM OF THE WORK

Laparoscopy is an effective method for the diagnosis and treatment of surgical pathologies in patients in whom the diagnosis cannot be made with physical examination and non invasive methods.

Chapter One

ACUTE ABDOMEN

Definition:

The term acute abdomen designates symptoms and signs of intra-abdominal disease usually treated best by surgical operation. Many diseases, some of which do not require surgical treatment, produce abdominal pain, so the evaluation of patients with abdominal pain must be methodical and careful. The proper management of patients with acute abdominal pain requires a timely decision about the need for surgical operation. This decision requires evaluation of the patient's history and physical findings, laboratory data, and imaging tests. The syndrome of acute abdominal pain generates a large number of hospital visits and may affect the very young, the very old, either sex, and all socioeconomic groups [(1)].

General Incidence:

Abdominal pain accounts for 5% to 10% of all emergency department visits[(2)] or 5 to 10 million patient encounters in the United States annually.[(3)] Another study demonstrated that 25% of patients presenting to the emergency department complained of abdominal pain[(4)].

Acute surgical emergencies constitute about 50 per cent of all general surgical admissions. About half of these are for abdominal symptoms, predominantly pain and half of this group resolve without operation [(8)].

Chapter Two

LAPAROSCOPIC ANATOMY OF THE ABDOMINAL CAVITY

In only the past one and a half decades, the surgeon has become capable of inspecting every recess of the abdomen with extremely high resolution and magnification through a tiny incision in the abdominal wall. By placing a laparoscopic video camera into the abdominal cavity, not only the surgeon but the entire surgical team may achieve a visual perspective, thus accelerating the learning of surgery and anatomy.

The laparoscope has its limitations – the view is often confined to only one area of several centimeters – but this view has likely enhanced our understanding of abdominal anatomy in a surprising number of ways. We now may see directly over the top and underneath the liver, and we can place a 15–20 X magnified view of the pelvis directly on the video screens in the operating room, or save them for digital reproduction in lectures, conferences, and texts.

More evidence that a new era for anatomy is upon us relates to educational aspects of abdominal, and particularly pelvic, anatomy. For nearly all generations of surgeons of the 20th century, only the operating surgeon and maybe the first assistant could see into the depths of the pelvis and learn about the relationships of various organs during an actual operation

such as low anterior resection. In the current era, actually for the first time in the history of surgery, the entire operating team, including the nurses, anesthesia team, and all of the surgical trainees including medical students may watch an entire pelvic operation and understand the relationships of the various organs, vessels, and nerves as the surgery unfolds on the video screen. Additionally, owing to magnification, many of the smaller structures, such as the tiny branches of the pelvic nerves, can be seen clearly and reliably during each and every operation [(9)].

Overall Evaluation

The overview of the abdominal anatomy has begun using the laparoscope placed into the umbilical port. This central location permits the surgeon the best vantage point from which to perform nearly all procedures, and from this point nearly all of the illustrations/photographs of the chapter have been taken. Once successful entry into the abdomen is accomplished, we recommend a quadrant by quadrant viewing of the abdomen, to ensure that nothing significant is overlooked. We start in the right upper quadrant (RUQ), and move in a clockwise manner in order to see all quadrants and then the pelvis [(9)].

The Right Upper Quadrant

To best see the RUQ, the patient should lie in the reverse Trendelenburg position with the body tilted with the right side up.

First, the liver should be assessed overall for its shape, size, and surface texture (Figure 1). Also demonstrable is the under surface of the right diaphragm (Figure 2). Generally, the umbilical port is best for doing this,with instruments in the other ports used for lifting up the edge of the liver and looking underneath at the porta hepatis, and the gallbladder (Figure 3). Also visible is the hepatic flexure of the right colon with the duodenum, in thinner patients the pancreatic head, gallbladder, and the inferior aspect of the right lobe of the liver (Figure 4) [(9)].

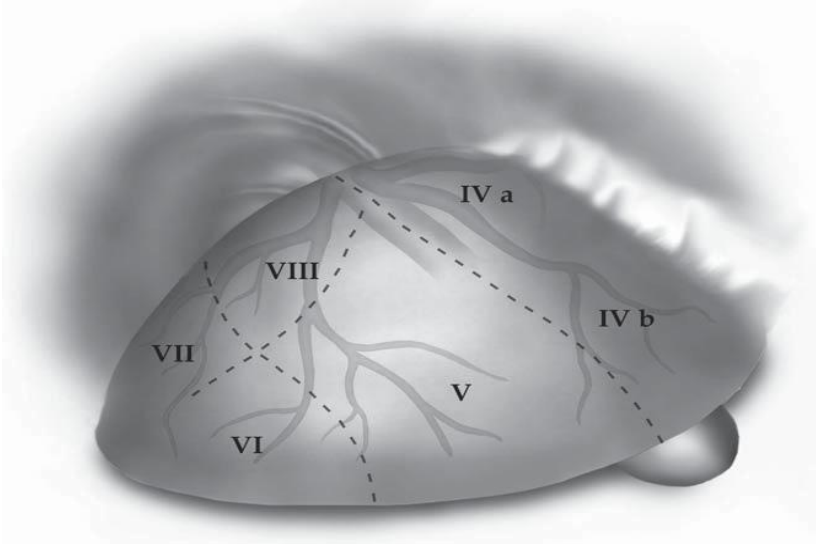

Figure (1): At the start of a laparoscopy, the liver to the right of the falciform ligament may be viewed broadly over its surface (hepatic segments of Couinaud and the hepatic veins are depicted in the drawing) [(9)].

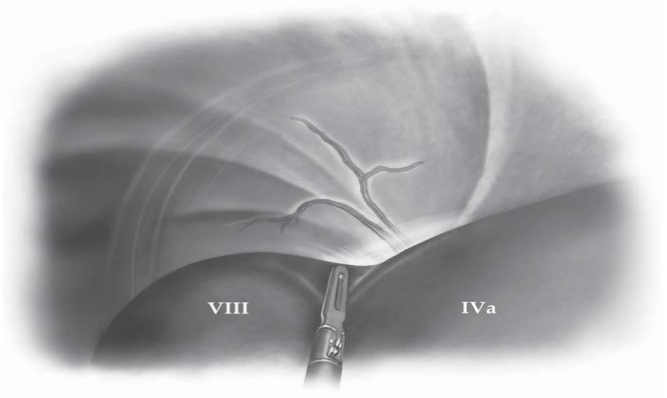

Figure (2): Peering above the right portion of the liver, the posterior portions of segments VIII and IVa and the undersurface of the right diaphragm may be seen[9].

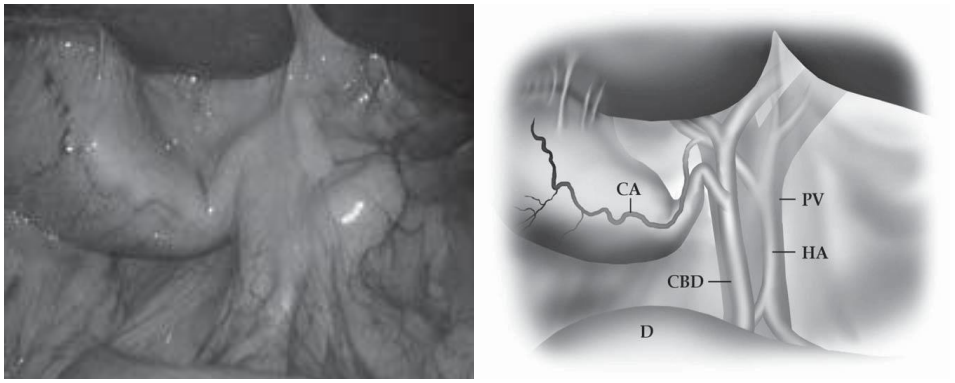

Figure (3): By lifting up the lower edge of the liver, the porta hepatic and the gallbladder may be seen. CA, cystic artery; CBD, common bile duct; D, duodenum; PV, portal vein; HA, hepatic artery[9].

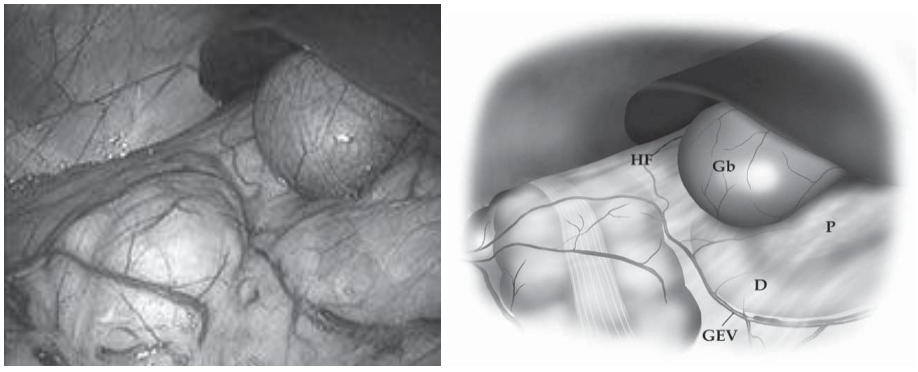

Figure (4): Just below the liver in a thin patient, the hepatic flexure, duodenum, and pancreatic head may be seen. HF, hepatic flexure; Gb, gallbladder; D, duodenum; P, pancreas; GEV, gastroepiploic Vessels[9].

The Left Upper Quadrant

By sweeping the laparoscope across the abdomen to the left side and tilting the left side of the body up, segments II and III of the liver can be easily inspected (Figure 5). The esophageal hiatus, the caudate lobe through the hepatogastric ligament, and the cardia of the stomach can be demonstrated by lifting up the left lobe with atraumatic grasper (Figure 6). Also demonstrable is the undersurface of the left hemidiaphragm, and the spleen. The splenic flexure, the splenocolic ligament, and the omentum may be easily visualized, along with the transverse colon (Figure 7). The body of the pancreas may often be seen indenting the transverse mesocolon in the left upper quadrant (LUQ) as well[9].

Figure (5): Just to the left of the falciform ligament, segments II and III are easily visualized in most patients[9].

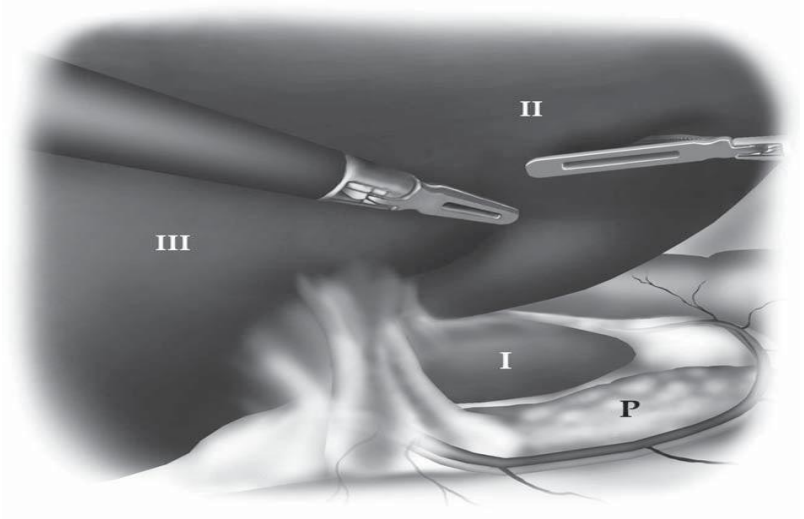

Figure (6): By lifting up segments II and III of the liver, the lesser sac and the caudate lobe of the liver (segment I) may often be seen in thin patients.P, pancreas. **(9)**

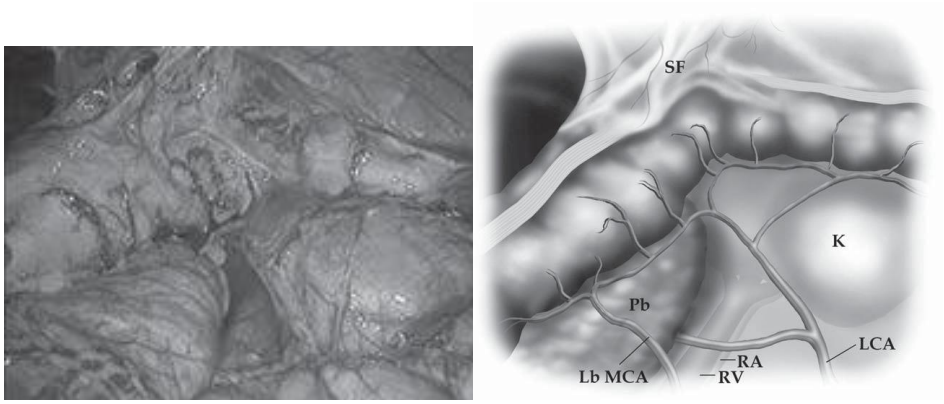

Figure (7): The splenic fl exure may be seen by lifting the omentum cephalad. In this thin patient, many of the left colonic vessels and retroperitoneal structures are seen. SF, splenic fl exure; Pb, pancreatic body; LbMCA, left branch of the middle colic artery; RV, renal vein; RA, renal artery; K, kidney; LCA,left colic artery. **(9)**

The Left Lower Quadrant

Sweeping the camera from the LUQ caudally, the descending colon, the ligament of Treitz, and vascular structures of the left mesocolon may be appreciated (Figure 8). To best see this area, the patient must be tilted with the left side up, and in some degree of Trendelenburg position. The attachments of the sigmoid colon to the lateral abdominal side wall and to the pelvis are easy to visualize, and the vessels supplying the left colon and rectum, including the inferior mesenteric artery and vein may be identifi ed by retracting the small bowel to the right side of the abdomen (Figure 9). The retroperitoneal structures in this quadrant, including the left gonadal vessels, the left ureter (Figure 10), and the hypogastric plexus (Figure 11) [(9)].

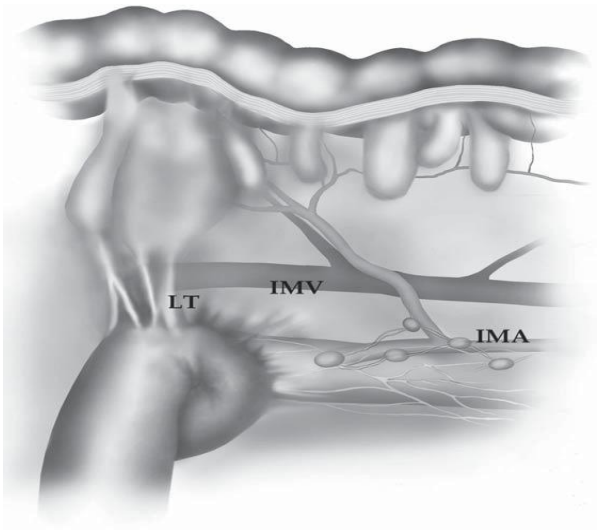

Figure (8): Just inferior to the splenic flexure, the ligament of Treitz and the main vessels of the left colon are seen. LT, ligamentof Treitz; IMV, inferiormesenteric vein; IMA, inferior mesenteric artery[(9)].

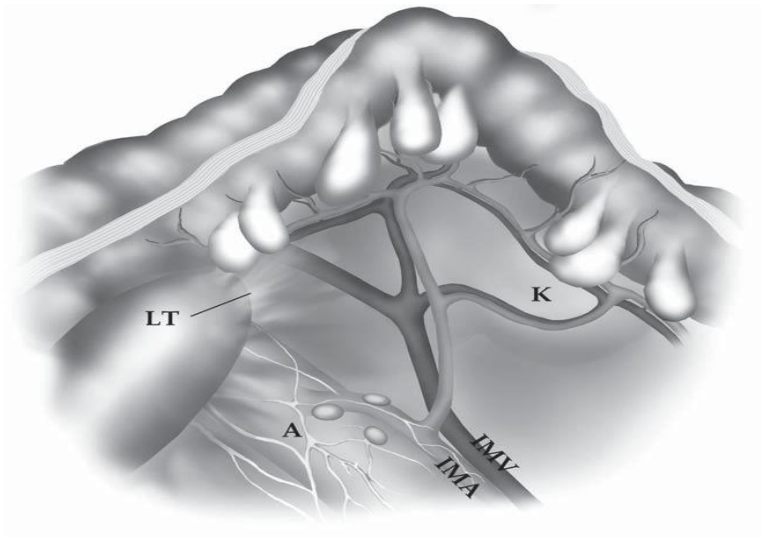

Figure (9): By retracting the small bowel to the right side of the abdomen, the attachments of the sigmoid colon and the main vessels of the left colon may be seen[(9)].

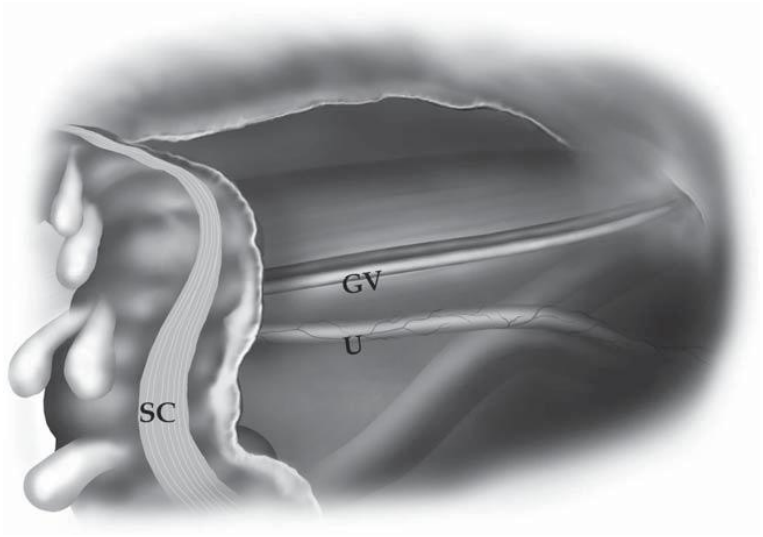

Figure (10): During the surgical mobilization of the sigmoid colon, the relationships of the gonadal vessels and the ureter are appreciated. SC, sigmoid colon; GV, gonadal vessels; U, ureter[(9)].

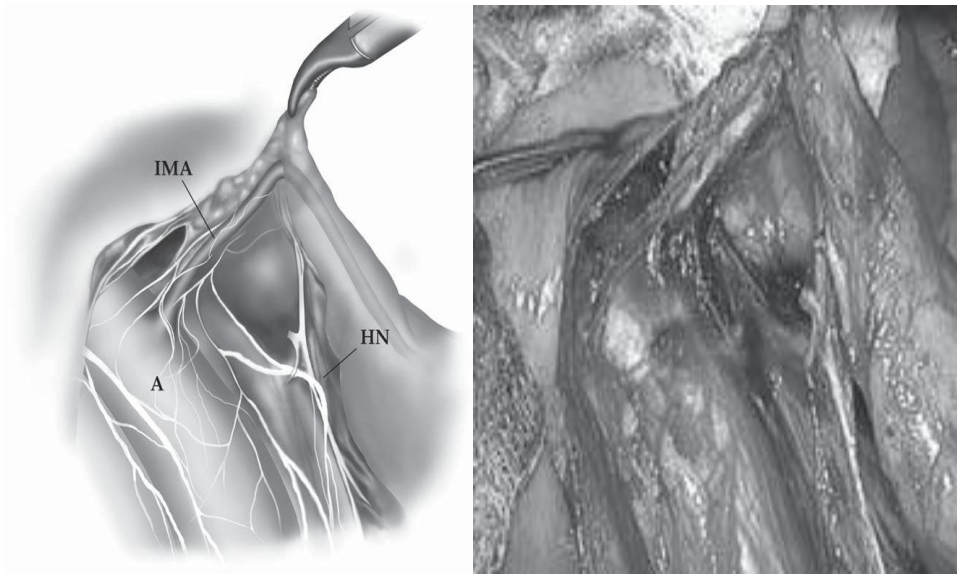

Figure (11): During a surgical dissection of the origin of the inferior mesenteric artery, the relationshipsof the hypogastric nerves and the aorta are appreciated. Note how the two branches (left and right) are straddling the aorta. IMA, inferior mesenteric artery; A, aorta; HN, left branch of the hypogastric nerve plexus[9].

The Right Lower Quadrant

By placing the patient in the Trendelenburg position with the right side up, the terminal ileum, its retroperitoneal attachments, the cecum, and the ligament of Treitz can be visualized (Figure 12). The vascular structures of the ileum and right colon may also be identified, and their relationship to the duodenum may be appreciated. With dissection of the ileum and right colon away from their retroperitoneal attachments, then the psoas major muscle, the psoas minor tendon, and the right gonadal vessels and ureter are easily seen. The hepatic flexure is well visualized as the ascending colon is mobilized from the retroperitoneum (Figure 13).

In thinner patients, the vascular structures in the transverse mesocolon (i.e., right and left branches of middle colic vessels) can be clearly demonstrated even before mesenteric dissection (Figure 14) [(9)].

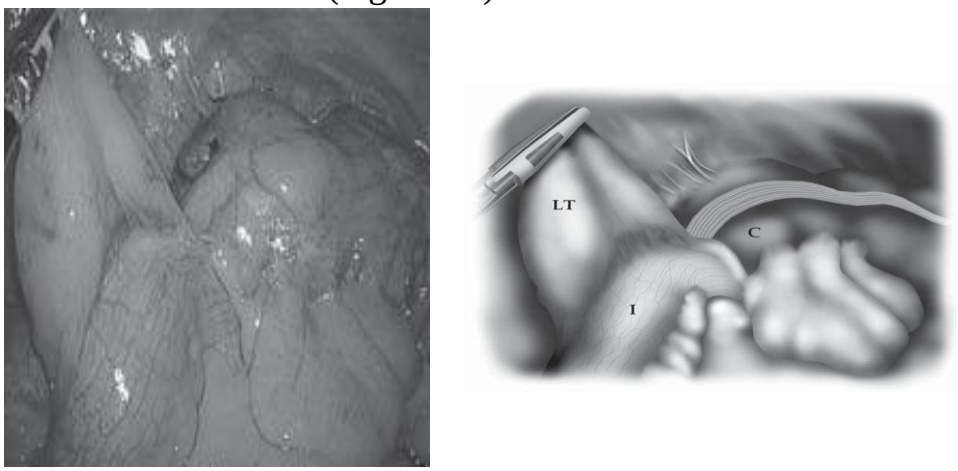

Figure (12): With a patient in the Trendelenburg position and the right side tilted upward, the terminal ileum, cecum, and ligament of Treitz may all be visualized. I, terminal ileum; LT, ligament of Treitz; C, cecum[(9)].

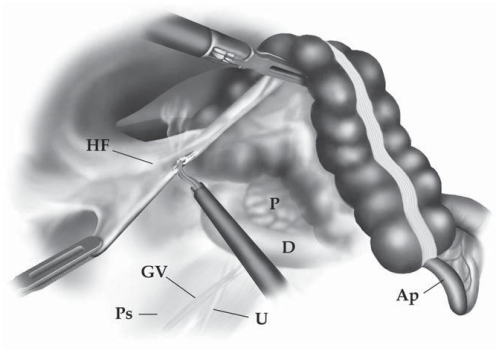

Figure (13): As the right colon is mobilized, the retroperitoneal structures are well seen. HF, hepatic flexure; Ps, psoas major muscle; GV, gonadal vessels; U, ureter; D, duodenum; P, pancreatic head; Ap, appendix[(9)].

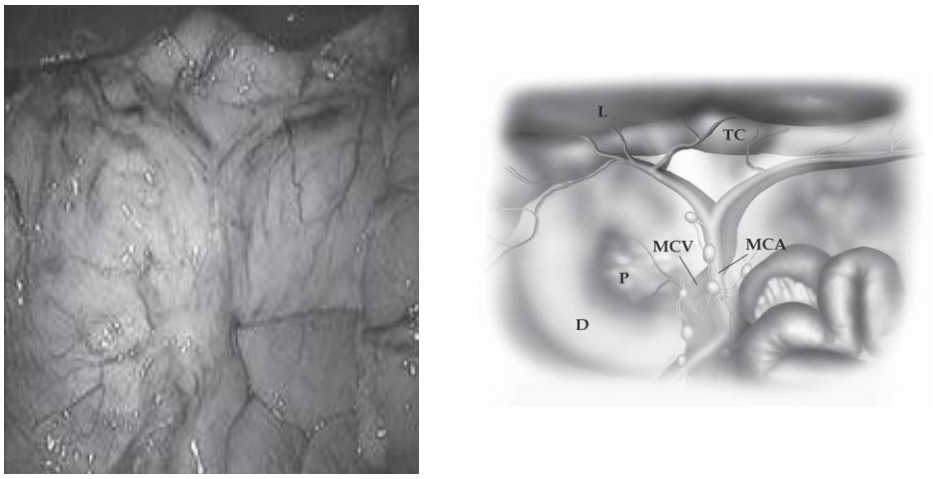

Figure (14): In thin patients, the vessels of the transverse colon and major structures in this region may be seen. L, inferior edge of liver; TC, transverse colon; MCV, middle colic vein; MCA, middle colic artery; D, duodenum; P, head of pancreas[9].

The Pelvis

In the Trendelenburg position, by displacing the small bowel contents into the upper abdomen, the pelvic contents may be inspected. Often it is surprising how well the pelvis may be seen as compared with open surgery, and part of this is attributable to the distension of the pelvis from the pneumoperitoneum. The relationship of the pelvic vessels to the organs is seen, and the inguinal areas are also visualized in a manner not often appreciated during conventional surgery (Figure 15). In female patients, Douglas pouch can be clearly observed by gently lifting up the uterus with an atraumatic grasper (Figure 16).

The ovary can be further inspected by lifting it with the tip of the instrument (Figure 17). Once the rectum is mobilized,