The primary trocar insertion in laparoscopic cholecystectomy after cesarean section scar: A comparative study between Hasson Technique and Verres Needle

Jalil Ibrahim Awaid alrubaye1*, Hussein Ali Abed Ahmad2, Malik Gata Ressan Al-hashimi3

1. Department of surgery/Al -Zahra Hosp Al-Kut, Iraq
2. College of Medicine, Wasit University, Iraq
3. CABS/Iraq

*Corresponding author
Jalil Ibrahim Awaid
hussein20570011@yahoo.com

ABSTRACT
A Prospective study in AL-Zahra teaching hospital of Iraq from May 2011 until May 2014 on 623 female patients, all of them have previous Caesarean section scar underwent laparoscopic cholecystectomy. The patients were randomized into two groups. Group A (307 patients), the Hasson cannula was used and group B (316 patients), were the Veress needle used. Variables comparing both methods were studied included the age, the time is taken to establish pneumoperitoneum, the number of attempts of insertion and conversion to an alternative method, conversion to open cholecystectomy and causes of conversion in both methods was studied regard the primary port access only. Majority of the patients were middle-aged (mean age 41 years), Conversion to open cholecystectomy occur in 22 patients (3.5%) in both groups. Short mean access time was achieved with the Veress needle (6.6minutes) compared with (9.5minutes) in the Hasson method. Conversion to an alternative technique occurs more in Veres needle 21 patients (6.6 %), and 3 patients (1 %) in the Hasson method. Conversion to open cholecystectomy occurs more in Veress needle 12 (4.4%) and 8 (2.6%) with the Hasson method. The major causes of conversion was severe adhesion of previous caesarian section scar (57%) followed by bowel and omentum injury (28%), obesity(7%) and Gas leakage( 7%) in Veress needle while, Gas leakage(50%), obesity(37.5%) and severe adhesion of previous Caesarean section scar (12.5%) in Hasson method.

Key words: laparoscopic cholecystectomy, Caesarean, Hasson cannula, Veress needle ,trocar

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Introduction
Women are substantially more likely than men to create gallstones. Gallstone illness occurrence in all populace is 3% - 20% of the all-out populace around the world [1]. Women are multiple times bound to create gallstones than men [2]. This is essential because of the sex steroid hormone, estrogen, and progesterone. These two hormones influence biliary cholesterol levels and gallbladder motility [3]. Pregnancy expands the hazard for gallstones, and pregnant ladies with stones are bound to have indications than nonpregnant women. [3]. Hormone substitute treatment duplicates or triples the hazard for gallstones, and gallbladder operation surgery. Estrogen raises triglycerides, an unsaturated fat that builds the hazard for cholesterol stones. Women who take a pill face a high risk of gall stone [4].Over the previous century delivery by the cesarean method has been expanded in most countries [5, 6]. Ladies today are multiple times bound to experience cesarean delivery than thirty years prior. In many developed nations, the cesarean delivery rate is 20-25% [7].

Cesarean delivery has increased in Iraq as of late representing 79 percent of births at private medical clinics. The increase in cesarean delivery is essential because of private medical clinics, where women pay out of pocket. Be that as it may, as Iraq's economy improves and more individuals settle on private medical clinics. The speed of cesarean delivery in Iraq has progressed from 18 percent in 2008 to 32 percent in 2010. The previous rates were close to the world average [8][9]. The different abdominal incision has been utilized for cesarean delivery. They incorporate a vertical entry point (midline and paramedian) and a transverse cut (P.fannenstiel, Maynard, Cherney, and Joel-Cohen) [10]. The transverse incision is related to less postoperative grip and preferable corrective outcomes over the upright midline incision. Nonetheless, the transverse suprapubic skin incision is the most widely recognized procedure utilized for cesarean delivery in most countries. The Pfannenstiel incision and Joel-Cohen abdominal incision is the normally utilized lower abdominal incision in the Cesarean delivery. Pfannenstiel used the Pfannenstiel incision in 1900 and in
1954 Joel-Cohen modified the incision \cite{11,12}. The separation of tissue injuries blood vessels cause ischemia that delayed the healing of peritoneum and more adhesions. It is estimated that more than three quarters (75% to 93%) of patients who undergo hysterectomy or cesarean section, develop abdominal adhesion \cite{13,14}.

These adhesions are produced as a feature of the ordinary recovering process, yet their production and leeway could get deficient because of the degree of tissue taking care of during the surgery operation, the hereditary inclination to adhesions development, age, contamination of the worked site, and different components. They are once in a while called interior scars \cite{15}. After Caesarean section through a Pfannenstiel incision, the speed of adhesion development at the umbilicus possibly up to 23% \cite{16}. The umbilicus could not, as a result, be the most suitable site for the main trocar placing following the prior cesarean section. However, the formation of the pneumoperitoneum is the initial and most significant step of a laparoscopic process is a blind process, and it is a problem for all the associated complications. Over 50% of the complications arise during this time \cite{17}. These complications occur even in the hands of experienced surgeons \cite{18}. Discovery of a protected entry method is a priority not just for the life of the patients but as well as for other laparoscopic expansion.

Method

The study conducted in AL-Zahra teaching hospital of Iraq from May 2011 until May 2015 on 623 female patients all of them has previous caesarian section scar underwent laparoscopic cholecystectomy. The pre-operative data collected were age, body mass index (BMI) and obesity all of them have previous single caesarian section scar and those with multiple caesarian section scar and upper abdominal surgery scar were excluded from study, biochemical examination include liver function tests (LFT), white blood cells (WBCs), and gall bladder ultrasound result. The body habits of the patients were classified as (normal, overweight and obese).All patients learned of the opportunity of exchange entry method or conversion to open cholecystectomy. Patients were divided into two groups. In group A (307 patients), Hasson cannula was used in group B (316 patients) Veress needle was used. Variables comparing both methods were studied included the age, the time is taken to establish pneumoperitoneum , the number of attempts of insertion and conversion to an alternative method, conversion to open cholecystectomy and causes of conversion in both methods was studied regard the primary port access only.

Results

The study showed the conversion to open cholecystectomy occur in 22 patients (3.5%) in both groups. In group A (Hasson cannula), the mean access time is (9.5 minutes). Multiple attempts of insertion occur in 3 patients (1%) due to severe adhesion of previous caesarian section scar. Conversion to open cholecystectomy occur in 8 patients (2.6%) one of them (12.5%) due to severe adhesion of previous caesarian section scar, three of them (37.5%) due to the obesity that enable to establish and maintain sufficient pneumoperitoneum, and four (50%) due to gas leakage, no bowel or vascular injury.

In group B (Veress needle), the mean access time was (6.6 minutes) in 8 (%). Multiple attempts of insertion and conversion to alternative method occur in 21 patients (6.6 %) from them 9 (43%) patients conversion to Left upper quadrant (LUQ, Palmer’s point) and 12 (57%) patients to Hasson method as a result to the inability to peritoneal access and enough pneumoperitoneum because of severe adhesion of previous caesarian section scar in 17 patients (81%) and 4 patients (19 %) due to obesity. Conversion to open cholecystectomy occur in 14 patients (4.4%) 8 of them (57%) due to severe adhesion of previous caesarian section scar, 1 of them ( 7%) due to the obesity that enable to establish and maintain sufficient pneumoperitoneum, one patient (7%) due to gas leakage, two patients (14%) due to omentum injury, one (7%) due to mild bowel serosal injury and one (7%) due to severe bowel injury occur because of severe adhesion that need explorative laparotomy, no vascular injury.
Figure (1) Comparison between verres and hasson methods regarded time

Figure (2) Comparison between verres and hasson methods regarded conversion to other methods
In addition, the fast mobilization and hospital release following laparoscopic cholecystectomy could prove additional beneficial for these patients. Study identified gas leakage and extraperitoneal insufflation as the third major reason for the conversion of LC to OC occur in 5 patients (0.8%) from all patients figure (3,4,5). The failure rate due to gas leakage occurs more in Hasson method 4 patient (1.3%) and only one patient (0.3%) with Verres method, we found that Verres method was the safest one for entry with gas leakage after caesar.
Figure (5) causes of conversion to Open Cholecystectomy in both verres and hasson methods

Discussion

The majority frequent main abdominal operation done on females is cesarean delivery \[5, 6\]. Gall stone disease is very common in Iraqi women (77% women and 23% men) \[19\], a large number of them had the previous history of the caesarian section. The speed of adhesion development at the umbilicus could be up to 23% following low transverse incision. \[20\]. This study analyzed the safest method to gain the primary access in the abdominal cavity for laparoscopic cholecystectomy after caesarian section. The mean age of our patients was 41 years, the occurrence of gall stones increases with age due to an increase in cholesterol content in bile. The same result reported by Saeed et al \[21\] and close to Pervez et al and Krishnan et al \[22, 23\].

In our study, the greater time needed with the Hasson technique (9.5 minutes) while (6.6 minutes) with the Veress needle technique chart (1), this because of the bigger incision related to the Hasson cannula technique. Without a doubt, the incision is a scaled-down laparotomy rather than the Veress needle procedure likewise we experienced the issue of 'gas spill'. This was settled by fixing by the anchorage of the cut belt to the trocar, this devours time in the Hasson cannula technique. This is additionally like previous investigations. Merlin et al found that the closed procedure took half of the time required by the open procedure \[24\]. The European Association for Endoscopic Surgery likewise inferred that the addition of the first trocar with the Veress needle is quicker compared to the Hasson cannula procedure \[25\].

Multiple attempts of insertion and Conversion to alternative method occur in 24 patients (3.8%) from all patients chart (2), 21 patients(6.6 %) with Veress needle group, cause of conversion was the sever adhesion of previous caesarian section scar in 17 patients(81%) and 4 patients (19%) due to obesity, Left upper quadrant (LUQ, Palmer’s) was the safest alternative site in 9 (43%) patients and Hasson method was the safest alternative method in 12 (57%) patients. While 3 patients (1%) only need more than one attempt in the Hasson group common cause of conversion was the sever adhesion of previous caesarian section scar. Borgatta et al, establish females with prior surgery confirmed a two-fold rise in conversion to insufflation with the Hasson method when they use the Veress needle primarily \[26\]. Copeland et al. reported women with previous surgery with whom Veres’s needle insertion was utilized, three percent required conversion to insufflation with the Hasson method \[27\].

Many research have demonstrated that insertion the Veress needle into the peritoneal cavity on the initial effort was successful in 85.5% to 86.9%, two effort were necessary in 8.5% to 11.6% of methods, three trials in 2.6% to 3.0%, and additional three trials in 0.3% to 1.6% \[28\]. Conversion to open cholecystectomy occur in 22 patients (3.5%) from all patients chart (3), more in Verres technique 14 patients (4.4%) and only 8 patients (2.6%) in the Hasson technique. The major causes of conversion was severe adhesion of previous caesarian section scar (57%) followed by bowel and omentum injury (28%), obesity (7%) and Gas leakage (7%) in Veress needle while, Gas leakage (50%), obesity (37.5%) and severe adhesion of previous Caesarean section scar (12.5%) in Hasson method. unfortunately, there seems to be a sense of shame associated with conversion, which is quite unjustified because it’s a sound surgical judgment \[29\].
early years of the laparoscopic cholecystectomy, the rate of conversion to open procedure was 2-15%. After years of learning and understanding the laparoscopic technique and increasing the surgeon’s experience, the conversion rate has been dropped to approximately 1 - 6% [26,44].

Our study was near to other studies done on normal population, like Pervez et al [22], Saeed Hadi et al [23] reported a conversion rate 8.3% and Vandersteen et al conversion rate was 12% [31]. In our study, adhesions are the common reasons for the conversion of LC to OC in Verres method 8 patient(57%) and only1 patient (12.5%) with Hasson method, chart (3,4,5) that in agreement with other studies [31]. We found that the Hasson method was the safest one for entry with adhesion after Caesarean section scar. Linkages at the umbilical region are found in about% of all laparoscopies [16, 43], what’s more, 20% to 28% in the individuals who have had past flat caesarian area incision, and from half to 60% in the individuals who have had a past longitudinal incision. [32, 33].

Women with midline incisions had considerably additional adhesions than those with every form of incisions and just 0.02% in females with no prior abdominal surgery [34]. In our study, we found that Obesity with Caesarean section scar is the second common reasons for conversion of LC to OC, occur in 4 patients (0.6%) and to change primary entry method, occur in 4 patients (0.6%) from all patients chart (3,4,5). The failure rate due to obesity (BMI > 30 kg/m2) is only1 patient (0.3%) with the Verres method and more in Hasson method 3 patient (1%). There is considerably additional subcutaneous fat in the umbilical region. The slant of addition is more important as this adipose layer confines the free rotating motion of operational ports. If the needle is placed vertically, the mean space from the inferior edge of the umbilicus to the peritoneum is small, this allows the position of a typical extent needle yet in very obese females. Placing at 45°, indeed, even from inside the umbilicus, This means that the needle has to cross extended distances, therefore longer ports and instruments should be used [34,35].

Open Hasson admission requires a bigger skin incision to observe in the fat women, and the general operation moment is usually extended [38]. Even though abdominal depth correlate with women weight, trunked obesity could raise abdominal wall depth out of quantity to the women weight which is supplementary frequent in our nation, thus, assessment of the abdominal wall previous to laparoscopy is significant. The study illustrate that Verres way was the suitable one for admission with obese(BMI > 30 kg/m2) after caesarian delivery scar, though the postoperative morbidity and mortality speed, in addition to the excellent delayed results, let us terminate that laparoscopic cholecystectomy is efficient and protected in obese women with prior caesarian part scar Rian section scar. Shea et al found gas leakage in 2.1% of alterations [38]. Binger, Peters, et al, found gas leakage in 7.4% as a cause of conversions [37,38].

Extraperitoneal insufflations and gas leakage is the mainly frequent difficulties of laparoscopy, often cause to an abundant of the process in additional attempts to attain pneumoperitoneum are typically ineffective [31]. Kabukoba and Skillern explain a method to an agreement with extraperitoneal insufflation that need the laparoscope to be missing in the pre-peritoneal space and the gas not evacuated. The Veress needle is then re-introduced to the pre-peritoneal space in frontage of the telescope and visual guide to the peritoneal cavity [39]. The appropriate intra-abdominal pressure remains controversial. Final pressures have been advocated from 10 mm to 30 mm Hg [40]. The basis for the elevated pressure entrance method is that it methods larger splint of the frontal abdominal wall. A study demonstrated that when applied 25 mm Hg pressure, the tip of the trocar never contacts abdominal contents [41].

Accidental injuries to the bowel and omentum are the 4th common reasons for conversion of LC to OC occur in 4 patients (0.6%) chart (3, 4, 5), two patients due to omentum injury (0.3%), and two patients due to bowel injuries (0.3%), one mild bowel serosal injury that successfully repaired and one sever bowel injury that needs explorative laparotomy, all of them with Verres method (1.2%), occurs because of severe adhesion. Bowel injuries were disasters complications in laparoscopic cholecystectomy with high morbidity and mortality [42]. Shea et al [38] reported (0.9%) conversion rates due to bowel injury. In our study, (0.3 %) were due to bowel injuries. In conclusion, primary trocar insertion for Laparoscopic Cholecystectomy after Caesarean section Scar can be introduced by both methods, although the Verres needle is faster, Hasson technique was safer and should be working for high-risk patients, like those with a previous caesarian section scar.

Security permits: clearance was taken from a government hospital in Wasit province with the knowledge of the government administration and patients.

Ethical statement of the subject of research came with the approval of the doctors supervising the condition of their patients in addition to the reviewers to follow up their healthy condition throughout the research period.

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References:
