

## **ROLE OF LAPAROSCOPY IN PREGNANCY**

### **DR. NIGHAT AFTAB RAZA M.B.B.S; MCPS, MRCOG, D.MAS**

SENIOR SPECIALIST OBSTETRICIAN AND GYNECOLOGIST  
AL WASL HOSPITAL, DUBAI, UAE  
MEMBER OF WORLD ASSOCIATION OF LAPAROSCOPIC SURGEONS

### **Dr. K. MISHRA M.MAS; MRCS**

SENIOR CONSULTANT LAPAROSCOPIC SURGEON  
DIRECTOR, LAPAROSCOPY HOSPITAL, NEW DELHI  
MEMBER WORLD ASSOCIATION OF LAPAROSCOPIC SURGEON  
MEMBER INDIAN ASSOCIATION OF GASTROINTESTINAL ENDOSURGEONS  
MEMBER SOCIETY OF AMERICAN GASTROINTESTINAL AND ENDOSCOPIC SURGEONS

*PROJECT SUBMITTED TOWARDS COMPLETION OF DIPLOMA IN MINIMAL ACCESS SURGERY, LAPAROSCOPY HOSPITAL, NEW DELHI, INDIA. MAY 2007*

### **ABSTRACT**

The role of laparoscopic surgery in pregnancy for gynaecological and nongynaecological reason is still under debate for the safety of mother, fetus and long term effect on child. Laparoscopy surgery in pregnant women significantly reduce day of hospitalisation, reduce use of narcotics, early return to a normal diet and resumption of work. The therapeutic laparoscopy in pregnancy (all trimesters) is safe. In heterotrophic pregnancy and cases of heterotrophic pregnancy with ovarian hyper stimulation after removal of ectopic pregnancy, the rest of pregnancy went uneventful and patient delivered vaginally. Laparoscopy in non gynaecological for example appendectomy, cholecystectomy is successful outcome in all trimester suggest that laparoscopy is a safe operative procedure in pregnant women. The aim of this review of many articles is that laparoscopy is a safe procedure in pregnancy with better outcome.

### **KEYWORD**

Laparoscopy pregnancy

Cholecystitis in pregnancy

Appendectomy

Appendicitis

Adnexal mass in pregnancy

Ovarian cyst in pregnancy

Heterotrophic pregnancy and hyperstimulation of ovarian

Pelvic mass in pregnancy

Ovarian tumour in pregnancy

## **MATERIALS AND METHODS**

The review of articles in laparoscopy in pregnancy done through literature search using Google Midline pub med and Springer library facility available at Laparoscopy Hospital New Delhi. The search engine Google was used to find out related articles by using the keywords (as mention earlier).

## **INTRODUCTION**

The most common nonobstetric emergency in pregnancy are appendicitis, cholecystitis, gynecological emergency needs surgery in pregnancy are ovarian cyst, adnexal mass, heterotropic pregnancy. Acute pain in abdomen in pregnancy may be due to gynaecological or nongynecological causes or may be non-specific. Patient may present with nausea with or without vomiting and pain in abdomen. Sometime specify the part of abdomen and nature of pain may be dull sharp or continuous. The pain due to appendix need to apply the changes in anatomical and physiological changes in pregnancy.

At each trimester the position of appendix will change. Acute abdomen should be ruled out for other causes before proceeding to laparoscopy.

Since the past few year laparoscopy surgery has become very common as it provides quick recovery, short hospital stay, less pain, but needs prolonged anaesthesia and increased complication with an inexperienced surgeon.

## **Appendicitis in Pregnancy**

Appendicitis in pregnancy range from 0.05% -0.13%. Appendicitis is found more in second and third trimester. The incidence is same for pregnant and non pregnant women, delay in surgery result in complication like perforation of appendix. It increase maternal morbidity, although there is a difficulty in diagnosing appendicitis but appendectomy should no be delayed to avoid complication. <sup>1</sup>

Laparoscopy surgery can be performed during pregnancy. One limitation maybe the size of the gravid uterus in third trimester interfere for visualisation and instrumentation due to the size and occupying the full tummy.<sup>3</sup>

## **Pregnancy with Cholecystitis**

Pregnancy with other non gynaecological conditions like gall stones symptomatic or complicates are common reason for surgery during pregnancy. Gallstones are present in 12% in all patients.

Pregnancy with gall stones, pancreatitis and jaundice present with high recurrence rate exposing both mother and fetus to an increase morbidity and mortality .<sup>4</sup>

The successful outcome in all trimester suggest the laparoscopic procedure can be done throughout all trimester but preferable in second trimester.<sup>7</sup>

### **Role of laparoscopy in abdominal pain**

Abdominal pain in pregnancy is dilemma for diagnosis and pose a diagnostic and management challenge for attending doctor. Many differential diagnoses are easy as they are specific to pregnancy. Gynaecologist and obstetrician are reluctant to do abdominal X-rays for patients. Patients should be re-evaluated when the symptoms fail to settle<sup>8</sup>

### **Laparoscopy in heterotopic pregnancy**

The role of laparoscopy in the diagnosis and management of heterotopic pregnancy is very important as heterotopic pregnancy rate increase with IVF. The outcome of uneventful pregnancy as. Laparoscopic salpingectomy was done and Patient delivered at 39 weeks.<sup>9</sup>

### **Laparoscopy for pregnancy and adnexal masses**

Adnexal masses, ovarian cyst are common in pregnancy. The routine use of ultrasound examination during pregnancy diagnosed more adnexal mass although most of the patients are clinically asymptomatic. Adnexal masses detected during early pregnancy disappear within the first 16 weeks of pregnancy.

About 1 in 1000 ovarian tumours is diagnosed and nearly 3% are malignant. Management of these patient are same as non pregnant. Patient during early stages, of pregnancy (organogenesis). Abortion has to be consider before commencing chemotherapy. If fetus is not viable at the time of primary surgery, chemotherapy for ovarian cancer applied during pregnancy.<sup>10</sup>

Laparoscopic management of adnexal mass in pregnant women 75% of the pregnant continue to term without complication and deliver an average size baby.<sup>11 12</sup>

Case reported that an adnexal torsion is an uncommon but very serious complication in pregnancy. It is difficult to diagnose the nature of ovarian tumour and spillage of cyst content. Emergency laparoscopy with saline irrigation shows successful outcome.<sup>13</sup>

### **Adnexal torsion in pregnancy**

If adnexal torsion in pregnancy not dealt quickly will end up in loss of the ovary.<sup>16</sup> Operative laparoscopy is changing the methods of treatment of the acute abdomen in advanced pregnancy. Diagnostic capabilities in identification of benign disease are becoming more sensitive with the use of advanced imaging ultrasound scanning and magnetic resonance imaging. This has changed the deciding factors in the handling of advanced-size adnexal masses with minimally invasive techniques

for the conservative management and treatment in advancing pregnancies. This case shows the successful removal of a 6198-g ovarian serous cystadenoma by use of minimally invasive techniques.

**Benign cyst teratoma** in pregnant women responsible for complication such as torsion Cristalli B<sup>19</sup> in a study involved 8 women less 17 weeks pregnant managed laparoscopically without any complication of pregnancy. In Laparoscopy surgery in pregnancy: Long term follow up done in Department of Surgery ,Washington Hospital Centre Washington ,DC proving to be as safe as open surgery in pregnancy .This article reports long term follow up with no deleterious effects to either mother or children.

#### Laparoscopy in the management of antenatally detected liver masses

No clear diagnosis could be made with radiologic investigation in the neonatal period. Definitive diagnosis was made laparoscopically: focal nodular hyperplasia was confirmed with laparoscopy and biopsy. In cases where the etiology of a liver mass remains unclear after radiologic investigation, laparoscopic intervention may prove beneficial in neonates and infants.<sup>22</sup>

#### MANAGEMENT OF LAPAROSCOPY DURING PREGNANCY

The common non gynecological conditions are appendicitis and cholecystitis, but other causes should be ruled out before forming laparoscopy.

<b>Non-pregnancy-associated causes of abdominal pain</b>
<ul style="list-style-type: none"><li>· Appendicitis</li><li>· Gall-Bladder Disease</li><li>· Pancreatis</li><li>· Peptic Ulcer (including <b>the rare Mecket's</b>)</li><li>· <b>Porphyria</b></li><li>· <b>Deep</b> Vein Thrombosis</li><li>· <b>Sickle</b> Cell Crisis</li><li>· Intestinal <b>Obstruction</b></li><li>· Inflammatory <b>bowel</b> Disease</li></ul>

- Urinal Tract infections
- Renal calculi
- **Trauma** (including unreported violence)

#### Extra-abdominal causes of abdominal pain

- Sickle-cell **crises**
- Cardiac pain
- Lower lobe pneumonia
- Referred pleuritic pain from pulmonary **embolism**
- Psychological disturbance
- **Drug** abuse or withdrawal

#### Causes of abdominal pain in pregnancy

##### Early Pregnancy

- Miscarriage
- Molar pregnancy
- Ectopic pregnancy
- Accidents to ovarian cysts
- Acute retention of urine (torsion, hemorrhage, rupture) associated with retroversion of the uterus,

##### Late Pregnancy

- Abruptio placentae
- Degeneration of a fibroid
- Liver pain associated with pre-eclampsia or the HELLP syndrome a Rupture of the uterus associated with previous uterine surgery, particularly caesarean section
- Pressure from the enlarging uterus,

<p>incarcerated fibroids or ovarian cysts</p> <ul style="list-style-type: none"> <li>· Degeneration of a fibroid</li> <li>· Complications of invasive prenatal diagnosis</li> <li>· Stretching of the round ligaments or pre-existing lesions</li> </ul>	<p>polyhydramnios</p> <ul style="list-style-type: none"> <li>· Musculoskeletal pain, particularly symphysisdiastasis</li> </ul>
--	---

The diagnosis of non gynaecological condition like appendicitis, when the co exist pregnancy +appendicitis the symptom are similar, anorexia, nausea and vomiting

Histories regarding pain in right lower quadrant diffuse periumblical pain migrating to the right lower quadrant. Displacement of the appendix due to increase separation of the visceral parietal peritoneum and enlargement of the uterus which decrease the ability to localize tendernus on examination further complicates diagnosis<sup>1</sup>.

Leukocytosis, C-reactive protein present in pregnancy can not rule out appendicitis Ultrasonography helpful in first trimester of pregnancy to diagnose appendicitis and to rule out other pelvic pathology. It is not useful as pregnancy progressed. In one retrospective case review found helical computed tomography to be 100% sensitive in diagnosis appendicitis in seven pregnant<sup>1</sup>.

Laparoscopy done during pregnancy port side locations were adopted to the size of gravid uterus. The Hasson Open Technique was used in five cases and veress neddle was in one case. Two patient had uterine infection in result in abortion after two days and Six weeks after surgery respectively other patient delivers after 36/52, 37/52<sup>3</sup>.

The Overall results of different studies shows laparoscopy in save in pregnancy

Cholecystectomy in pregnancy in most common non gynaecological procedure done during pregnancy.

Gallstones are present in 12% in all pregnancy patients medical treatment fail in more than 1/3rd cases the need surgical interference by laparoscopy

Gallstones with complication like pancreatitis exposing both foetus and mother to an increased risk of morbidity and mortality.

This study done for a period of four years all pregnant patient with symptomatic or complicated gallstone disease were studies prospectively at the Landeskrankenhaus in Salz burg Austria

All the patients were in 13 -32 weeks pregnant. Access was established by veress needle in all cases insufflation pressure was 8-10 mm. of Hg and mean operation time was 62 minute <sup>4</sup>

Laparoscopy Cholecystectomy during pregnancy 43 published cases of 2<sup>nd</sup> trimester laparoscopy Cholecystectomy done 39 cases ended in uncomplicated full turn normal delivery none of the patients under went Laparoscopy Cholecystectomy in 3<sup>rd</sup> trimester. Other published case of 12 3<sup>rd</sup> trimesters Laparoscopy Cholecystectomy only one patient went into preterm delivery. There was neither fetal monitoring done nor tocolytic used as prophylactic or postoperative<sup>7</sup>. Heterotopic pregnancy are more than before due to assisted conception technique. Patient conceive after IVF. Heterotopic pregnancy diagnosed by Ultrasonography. The out come of pregnancy was good patient delivered at 39 weeks a healthy baby wt 3.06 kg<sup>9</sup>

With the widespread use of abdominal ultrasound examination during pregnancy adnexal masses are observed. Laparoscopic management of adnexal mass in pregnant women reported in 14 cases in second trimester of pregnancy<sup>11</sup>

This study done in King Faisal University from 1982-1991. The method used for diagnosis is ultrasound scan. 25.4 % patient present teratoma the most common ovarian tumour found followed by serous cyst adenoma . Outcome of pregnancy was good.

Adnexal torsion is unusual. Method of diagnosis by scan and Doppler. Laparoscopy done in pregnancy with unwinding of the twisted tube and ovary with saline irrigation. The combination of two factors contribute successful outcome <sup>13</sup>

The primary modality used to detect ovarian mass by ultrasound to assess the risk of malignancy, there is lack of specificity because several markers can be elevated. Laparoscopic surgery is the main intervention for pregnancy for definite diagnosis.

More aggressive surgery is indicated in ovarian cancer in the risk of maternal mortality outweigh the fetal consequences <sup>17</sup> Benign cystic teratoma removal by laparoscopy done in study 18 the gestational age between 9-17 weeks inspite of significant risk of cyst rupture careful operation, irrigation of the pelvis avoid many chemical, peritonitis and potential adverse affect.<sup>18</sup>

### **Laparoscopy in HIV positive pregnant patients**

Laparoscopy is a safe procedure for HIV positive pregnant patient as there is less risk of needle injury to surgeon.

### **DISCUSSION**

The role of laparoscopy in pregnancy for diagnosis and treatment of non gynaecological and gynaecological condition is very important .The review of many articles published shows non

gynaecological condition like appendicitis, cholecystitis, gall stones and intestinal obstruction. Timely interference save the mother and the fetus. The morbidity and mortality is very low. Laparoscopy has been very useful in case of uncertain diagnosis. There is a role in laparoscopic appendectomy in the third trimester of pregnancy <sup>2</sup>.

One limitation maybe the size of gravid uterus which interfere with proper visualisation and instrumentation in the third trimester of pregnancy <sup>3</sup>

Symptomatic or complicated gall stone diseases are the most common reason non gynaecological operation during pregnancy.

The use of Veress needle in all cases and insufflations pressure was 8-10 mm of Hg. The outcome of all pregnancies was full term healthy babies with no post laparoscopic complications and there was no recurrence of complication present before laparoscopy i .e. pancreatitis and jaundice <sup>4</sup>

Laparoscopy during pregnancy compared with the safety and efficacy of open laparotomy six year case control done in tertiary care university and community hospital during first and second trimester with follow up 1 month to six year found laparoscopy surgery in pregnant women is significantly decreased hospitalisation narcotic use, quick return to normal diet <sup>6</sup>

In heterotropic pregnancy although very less case report are available but outcome is good <sup>9</sup>. The role of laparoscopic pregnancy for adnexal ovarian cyst shows successful outcome and help in cases of malignancy diagnosis.

Although there are only 0.3% malignant ovarian cyst. Ovarian teratomas are estimated to occur 1:1000 ovarian neoplasm are infrequently found in early pregnancy <sup>15</sup>

The overall result of different study shows laparoscopy appendisectomy is safe in pregnancy while delay in diagnosis usually result in perforated appendix

The rate of fetal loss in uncomplicated fetal appendicitis range from 0-1.5% but ruptured range from 20-35% Increase risk of wound infection and generalised peritonitis, premature labour in case of third trimester appendisectomy.

Maternal; mortality is extremely unusual <sup>1</sup>

Despite the difficulty of diagnosing appendicitis during pregnancy appendisectomy should not be delayed to avoid maternal and fetal complication.

The studies in Landeskrankenhaus in Salzburg, Austria results show all patient deliver full term babies. No post endoscopic or post operative complication seen in all patients. All patient enjoy full relieve of their symptoms and there was no repeated attack of jaundice or pancreatic. The successful outcome

in all trimester suggest laparoscopy is a safe procedure throughout pregnancy especially in second trimester.

The combination of ERCP (Endoscopic retrograde Cholangiopancreatogram) and laparoscopic cholecystectomy offer a safe and effective option for the definite treatment of gall stone disease and intractable pain during pregnancy and there is sufficient access for the combined treatment to be employed.<sup>4</sup> Ovarian cystectomy, ovarian malignancy managed with laparoscopy helps in early diagnosis by histopathology and management for further plan of treatment for malignancy.

Obstetrical consultation should be obtained preoperatively. When possible, operative intervention should be deferred until the second trimester, when fetal risk is lowest<sup>24</sup>.

### **Anesthesia and pregnancy**

Optimal anaesthetic care of patients undergoing laparoscopic surgery is very much important. The anaesthetic problems during minimal access surgery are related to the cardiopulmonary effects of pneumoperitoneum, carbon dioxide absorption, extraperitoneal gas insufflation, venous embolism and inadvertent injuries to intra-abdominal organs. Following precaution during anaesthesia facilitate risk free surgery and allow early detection and reduction of complications.

1. Pneumoperitoneum enhances lower extremity venous stasis<sup>28-29</sup> already present in the gravid patient and pregnancy induces a hypercoagulable state<sup>9,10</sup>. Therefore pneumatic compression devices should be utilized whenever possible.
2. Fetal and uterine status, as well as maternal end tidal CO<sub>2</sub> and/or arterial blood gases, should be monitored.
3. The uterus should be protected with a lead shield if intraoperative cholangiography is a possibility. Fluoroscopy should be utilized selectively.
4. Given the enlarged gravid uterus, abdominal access should be attained using an open technique. Hasson's Trocar and cannula to avoid trauma to the gravid uterus.
5. Dependent positioning should be utilized to shift the uterus off of the inferior vena cava.
6. Pneumoperitoneum pressures should be minimized (to 8 - 12 mm Hg) and not allowed to exceed 15 mmHg<sup>30</sup>.

### **CONCLUSION**

After reviewing the available literature laparoscopic surgery in pregnancy for nongynecological and gynaecological pathology is safe and effective well tolerated any adverse effect on fetus mother and child. Laparoscopic surgery reduce the hospitalisation use of narcotic, early resumption of work and

use of normal diet .The disadvantages are long anaesthesia and pneumoperitoneum (CO<sub>2</sub>) but it is well tolerated by the fetus metabolism. Overall conclusion is laparoscopy is safe in pregnancy.

## **REFERENCES**

[1] Rachele Guttmann Ran D Clinical Practice Appendicitis During Pregnancy Canadian Family Physician Med line 2004, vol. 50, mar, pp. 355-357.

[2] BARNES Stephen L. <sup>(1)</sup> ; SHANE Matthew D. <sup>(1)</sup> ; SCHOEMANN Mark B. <sup>(1)</sup> ; BERNARD Andrew C. <sup>(1)</sup> ; BOULANGER Bernard R. <sup>(1)</sup> ;Laparoscopic appendectomy after 30 weeks pregnancy: Report of two cases and description of technique Southeastern Surgical Congress, Atlanta, GA , ETATS-UNIS (31/01/2004) 2004, vol. 70, n° 8 (12 ref.), pp. 733-736 [4 page(s) (article)]

[3] De perrot et al Laparoscopic Appenectomy during pregnancy Surgical Laparoscopy Endoscopy Percutaneous technique 10(6) 368-371 Dec 2000

[4] Sungler P, Heinerman PM, Steiner H, Waclawiczek HW, Holzinger J, Mayer F, Heuberger A, Boeckl O. Surg Endosc. 2000 Mar;14(3):267-71. Laparoscopic cholecystectomy and interventional endoscopy for gallstone complications during pregnancy.

[5] Am J Surg. 1996 Apr;171(4):435-7.Laparoscopic surgery during pregnancy.Amos JD, Schorr SJ, Norman PF, Poole GV, Thomae KR, Mancino AT, Hall TJ, Scott-Conner CE.

[6] Arch Surg. 1996 May;131(5):546-50; Laparoscopy during pregnancy.Curet MJ, Allen D, Josloff RK, Pitcher DE, Curet LB, Miscall BG, Zucker KA.

[7] Obstet Gynecol Surv. 1998 Sep;53(9):566-74 .Laparoscopic cholecystectomy during pregnancy: a case series and review of the literature.Graham G, Baxi L, Tharakan T.

[8] Acute abdomen and pain in abdomen in pregnancy Usha Nair Current Obstetrics and Gynecology Volume 13 Issue 1 February 2003 page 14-20

[9] Remorgida V, Carrer C, Ferraiolo A, Natucci M, Anserini P. Laparoscopic surgery in pregnancy. A case report with a brief review of the topic. Surg Endosc. 1995 Feb;9(2):195-6.

[10] Onkologie. 2003 Apr;26(2):167-72. Adnexal masses in pregnancy.Hermans RH, Fischer DC, van der Putten HW, van de Putte G, Einzmann T, Vos MC, Kieback DG.

[11] J Reprod Med. 1999 Feb;44(2):97-100. Laparoscopic management of adnexal masses in pregnant women.Moore RD, Smith WG.

[12] Aust N Z J Obstet Gynaecol. 1991 Nov;31(4):327-30. Ovarian tumours in pregnancy.el-Yahia AR, Rahman J, Rahman MS, al-Suleiman SA.

[13] J Formos Med Assoc. 2000 Apr;99(4):345-7.Laparoscopic cystectomy of a twisted, benign, ovarian teratoma in the first trimester of pregnancy.Yen ML, Chen CA, Huang SC, Hsieh CY.

[14] J Minim Invasive Gynecol. 2007 Mar-Apr;14(2):247-9. Laparoscopic management of enlarged serous cystadenoma in advanced pregnancy.Johnson JR, Lee C, Carnett S, Vadakekut E.

[15] J Am Assoc Gynecol Laparosc. 1997 Feb;4(2):269-72. Laparoscopic excision of pelvic masses during pregnancy.Neiswender LL, Toub DB.

[16] Toure B, Dao B, Sano D, Akotionganga M, Lankoande J, Kone B Rev Med Brux. 1997 Dec;18(6):379-80.Adnexal torsion during pregnancy.

[17] Obstet Gynecol Surv. 2006 Jul;61(7):463-70.Managing ovarian masses during pregnancy.Leiserowitz GS.

[18] Laparoscopic management of benign cystic teratomas during pregnancy.

American Journal of Obstetrics & Gynecology. 174(5):1499-1501, May 1996.

Parker, William H. MD; Childers, Joel M. MD; Canis, Michel MD; Phillips, Douglas R. MD; Topel, Howard MD

[19] J Gynecol Obstet Biol Reprod (Paris). 1991;20(5):665-8.

Value of celioscopic surgical treatment of ovarian tumors at the beginning of pregnancy, Cristalli B, Cayol A, Izard V, Levardon M.

[20] Anne G. Rizzo Laparoscopic Surgery in Pregnancy: Long-Term Follow-Up Journal of Laparoendoscopic & Advanced Surgical TechniquesFeb 2003, Vol. 13, No. 1 : 11 -15

[21] Langenbecks Arch Surg. 2006 Sep;391(5):467-71. Epub 2006 Aug 15. Links

Laparoscopic management of appendicitis and symptomatic cholelithiasis during pregnancy.Halkic N, Tempia-Caliera AA, Ksontini R, Suter M, Delaloye JF, Vuilleumier H.

[22] Weinsheimer R, Watch L, Azzie G, Rozmiarek A Laparoscopy in the management of antenatally detected liver masses.J Laparoendosc Adv Surg Tech A. 2005 Aug;15(4):429-31

FOR MORE INFORMATION PLEASE LOG ON TO <http://www.laparoscopyhospital.com>