Objectives:

- Review modifications needed for high-BMI patients

- Discuss surgical strategies for the >250g uterus and show videos of TLH, uterine artery ligation at origin, morcellation, and removal.
The endemic of Obesity

We just signed Allergan’s petition even though we are obviously comfortable in our own skins!

http://4.bp.blogspot.com/_ziPiXEv_Q-g/S_PZT5I7ngI/AAAAAAAADAM/UIPSa7lHhc/s1600

http://pakmed.net/college/forum/?p=71336
Laparoscopy in Obese

• Significant change in outcome from OPEN to MIS
• Very important skills to develop.
• More challenging in Obese, but less challenging and less morbid MIS compared to open

☆ Prior studies (1970-1980s):
  ☆ 15-40 % undergoing GYN surgery are obese.

☆ Recent prospective studies (1990-2000s):
  ☆ 40 – 90 % are obese.

☆ Own data, endometrial Ca 55.5 % are obese

**Own data**

* Nahas, 2012-2015
* 118 endometrial cancer surgeries (TH, BSO, staging)
* 6 open (4 stage 4 disease for debulking, 2 conjunction with other surgeries)
* 1/112 convert to open BMI 51
* Conversion due to obesity: 1/112 (0.9 %)

---

**WHO Obese classification**

<table>
<thead>
<tr>
<th>Classification</th>
<th>N</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal, (BMI &lt;25)</td>
<td>16</td>
<td>14.5%</td>
</tr>
<tr>
<td>Overweight, (BMI 25-29.9)</td>
<td>33</td>
<td>30%</td>
</tr>
<tr>
<td>Obese, (BMI 30-34.9) Class I</td>
<td>26</td>
<td>23.6%</td>
</tr>
<tr>
<td>Sever Obese, (BMI 35-39.9) Class II</td>
<td>14</td>
<td>12.7%</td>
</tr>
<tr>
<td>Morbid Obese, (BMI 40-44.9) Class III</td>
<td>10</td>
<td>9%</td>
</tr>
<tr>
<td>Super Obese, (BMI &gt;45) Class III</td>
<td>11</td>
<td>10%</td>
</tr>
</tbody>
</table>
Hysterectomy in obese and non-obese for benign causes

- 2 studies (1200 cases), and review of the literature comparing abdominal, laparoscopic and vaginal.
- Showed Vaginal rout had the shortest OR time, but similar EBL, LOS, complication to laparoscopy
- OR time Laparoscopic = open
**Hysterectomy in obese and non-obese for benign causes**

- Complication increased with obesity in all route hysterectomy with no statically significant difference when comparing the different route of the hysterectomy.
- Both laparoscopic and vaginal should be preferred than open Hysterectomy due to less EBL, and LOS.


**Laparoscopic Hysterectomy in obese and non-obese for benign causes**

- Study 1460 cases
  - 6.9% Obese
  - 23.2% over weight
- French study 2271 cases 1995-2008
  - Comparing obese to non-obese
- No difference in ORT, LOS, EBL, and complication.

Kondo W et al, J L and AST 2012.
Laparoscopic Hysterectomy and BMI

- 330 pt from 9/96 - 7/02
- 7 converted (2%), one obese
- OR time - 156 min, EBL - 160 cc
- Complications
  - Major - 5.5%, Minor - 3.4%
  - Urologic - 3.1%, 2/3 in the first 1/3

Complications similar by BMI


Laparoscopic Hysterectomy and BMI

- TLH for uterine pathology, impact of BMI
- 9 years, retrospective
- 90/702 of TLH had uterine neoplasia.

O’Hanlan KA, Gynecol Oncol. 2006
Laparoscopic Hysterectomy and BMI

- No difference in OT, EBL, LOS, uterine weight, number of nodes, and complication

![Bar chart showing BMI groups and their corresponding number of patients](image)

O’Hanlan KA., Gynecol Oncol. 2006

Laparoscopic hysterectomy in early endometrial cancer

- Review article 47 studies including the biggest RCT LAP2
- Laparoscopic surgery had increased ORT, but significant reduction in EBL, LOS, and complication compared to open
- Similar OS, DFS
- It should be the recommended route

Acholonu UC et al. JMG 2012
Laparotomy VS laparoscopy in extremely obese patients with early endometrial cancer

- Italian study 75 patients BMI > 35.
- Laparoscopy was superior with less complication, surgical site infection, and post operative hospitalization.

Tinelli R et al, anticancer research, 2014

Laparoscopic hysterectomy in early endometrial cancer in obese and non-obese

- Increase ORT, similar EBL, LOS, and complication.
- Similar OS

Rabischong B et al, JMIG, 2011
Farthing A et al, J obs and Gyn 2012
Don’t worry!! It’s just like Scuba Diving

Which one is better?

BMI is not everything
What matters is central obesity.
Waist-hip ratio (WHR) > 0.85 indicate central obesity.
I usually eyeball it
Central obesity more prevalent and challenging (be ready for the BATTLE)

Mokdad JAMA 2001

Go in it as a warrior, well prepared (tactics, and tools).
This is how I go

Light at the end of the tunnel

- Be PATIENT
- The patient's outcome is worth it
Tips no one tells you about

Prior to surgery

- Anesthesia consult.
- IM, and Bariatric consult.
- Sleep apnea clinic.
- Full counseling with the patient, diagnosis, management option, recommendation, risk and benefits (most important risk is convert open and wound infection, prolong healing and care)
- Make sure you have a good setup, MIS and bariatric equipment (you can’t ask for it the same day)
MIS room and equipment might be expensive to setup $$ (most equipment are one time fee)

But cost-effective compare to open $$$

LOS, wound infection and home care, reoperation for hernia
Alternatives
Positioning

The Attending surgeon is responsible and no one else
Danger fold

Thick fold of tissue interferes with trocar movements

Some will tape the abdomen up to the table.
Flatten the abdomen down and put the trocar into the abdominal cavity.
More ports if needed, patient can still go home same day or the next
Methods for safe entry

- Veress needle
- Open laparoscopy (Hassan)
- Direct trocar entry
- Optical trocar system
- Alternate entry site (palmer's point)

How to plan the trocar
Energy source

Get comfortable with instruments
Retractors

Uterine manipulator
Vault closure

- You can close vaginally, difficult
- Best to do it laparoscopically

Monitor Intra-op CO2 and O2

- If CO2 rises, check abdominal pressure < 15 mmHg.
- Flatten the table and deflate abdomen, short break until CO2 normalize < 35
- Repeat if needed
- Good assist to shorten the length of the case
- It is not the time to train anyone when the patient is not safe.
- Meet with anesthesia and explain how important is MIS for better patients outcome (less bleeding, shorter LOS, less wound infection)
Different way of doing it

In the OR

- Team approach
- Surgeon must guide and supervise *everything*
- The surgeon is *the* team leader, So be a True one
Remember!!

It’s not the Wand,
....It’s the Wizard

TLH Massive uterus
Table 2: Baseline characteristics stratified by uterine weight

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (n = 983)</th>
<th>&lt;250 g (n = 723)</th>
<th>≥250 g (n = 260)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years) (median)</td>
<td>49 (15-67)</td>
<td>49 (15-60)</td>
<td>48 (36-77)</td>
<td>.033</td>
</tr>
<tr>
<td>Height (in) (median)</td>
<td>65 (56-81)</td>
<td>65 (56-81)</td>
<td>65 (56-81)</td>
<td>.545</td>
</tr>
<tr>
<td>Weight (lb) (median)</td>
<td>157 (90-390)</td>
<td>153 (90-350)</td>
<td>150 (90-350)</td>
<td>.163</td>
</tr>
<tr>
<td>BMI (kg/m²) (median)</td>
<td>26.3 (17.2-70.4)</td>
<td>26.2 (17.2-70.4)</td>
<td>26.6 (18.1-65.8)</td>
<td>.144</td>
</tr>
<tr>
<td>Uterine weight (g) (median)</td>
<td>114 (43-219)</td>
<td>114 (43-219)</td>
<td>447 (20.0-320)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Parity (no. delivered) (median)</td>
<td>1 (0-9)</td>
<td>1 (0-9)</td>
<td>1 (0-6)</td>
<td>.854</td>
</tr>
<tr>
<td>BMI (kg/m²) &lt;25 (thin)</td>
<td>398 (40.9%)</td>
<td>398 (42.1%)</td>
<td>95 (35.1%)</td>
<td>.107</td>
</tr>
<tr>
<td>≥25 (overweight)</td>
<td>255 (25.8%)</td>
<td>205 (24.5%)</td>
<td>88 (33.5%)</td>
<td>.078</td>
</tr>
<tr>
<td>≥30 (obese)</td>
<td>207 (21.1%)</td>
<td>152 (21.1%)</td>
<td>55 (20.9%)</td>
<td>.097</td>
</tr>
<tr>
<td>≥40 (morbidly obese)</td>
<td>65 (6.7%)</td>
<td>60 (8.3%)</td>
<td>25 (9.5%)</td>
<td>.037</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
<td>.210</td>
</tr>
<tr>
<td>Primiparas</td>
<td>581 (59.1%)</td>
<td>417 (57.5%)</td>
<td>164 (62.4%)</td>
<td></td>
</tr>
<tr>
<td>Multiparas</td>
<td>402 (40.9%)</td>
<td>306 (42.5%)</td>
<td>99 (37.6%)</td>
<td></td>
</tr>
</tbody>
</table>
No difference in complication and LOS

OR, EBL, LOS, decreased with the surgeon's increasing experience
Total laparoscopic hysterectomy in cases of very large uteri: A retrospective comparative study

Andrea Fiaccovento, MD, Stefano Landi, MD, Fabrizio Barbieri, MD, Riccardo Zaccoletti, MD, Carlo Tricolore, MD, Marcello Ceccaroni, MD, Paola Pominì, MD, Francesco Bruni, MD, David Soriano, MD, Ania Stepniewska, MD, Luigi Selvaggi, MD, Luisa Zanolla, MD, and Luca Minelli, MD

Table 1: Surgical outcomes

<table>
<thead>
<tr>
<th>Surgical outcomes</th>
<th>Group A</th>
<th>Group B</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs)*</td>
<td>46.3 ± 5.8 (45.4-47.2)</td>
<td>46.4 ± 6.3 (45.2-47.6)</td>
<td>.89 (NS)</td>
</tr>
<tr>
<td>Uterine weight (g)*</td>
<td>206.8 ± 79.4 (195.4-218.2)</td>
<td>728.6 ± 205.3 (679.3-760.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Operative time (mins)*</td>
<td>101.3 ± 34.3 (85.7-106.9)</td>
<td>146.1 ± 57.2 (137.8-160.4)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Blood loss (mL)*</td>
<td>108.3 ± 65.7 (88.7-119.8)</td>
<td>181.0 ± 136.4 (136.3-257.7)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Hospital stay (days)*</td>
<td>2.8 ± 0.7 (2.7-2.9)</td>
<td>3.5 ± 1.7 (3.2-3.8)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Time to well being (days)*</td>
<td>10 (7-15)</td>
<td>10 (4.3-18.0)</td>
<td>.86 (NS)</td>
</tr>
<tr>
<td>Intraoperative complications, No. (%)</td>
<td>0 (0)</td>
<td>2 (2)</td>
<td>.06 (NS)</td>
</tr>
<tr>
<td>Early minor complications, No. (%)</td>
<td>13 (8.7)</td>
<td>18 (18.0)</td>
<td>.03</td>
</tr>
<tr>
<td>Late complications, No. (%)</td>
<td>11 (7.4)</td>
<td>8 (8)</td>
<td>.66 (NS)</td>
</tr>
</tbody>
</table>

Group A: uterine weight < 150 g; Group B: uterine weight > 150 g.
*Data are mean ± 1 SE (95% CI).
†Data are median (interquartile range).

TLH Massive uterus

- **Technique TLH**
- **Safe Extraction**
Golden surgical principles

- Knowledge of anatomy
- Adherence to surgical technique
- Strategies for preventing complications are the same

Pre-operative consideration

- Port Placement
- Laparoscope Selection
- Instrumentation
- Pre-treatment
Set your self for success

- Port placement (everything moves higher)
  - Umbilical port higher (at least 5-8 from the fundus)
  - Identify the inferior epigastrics and place ports lateral to vessels
  - Place your lateral Higher, at the level of the umbilicus

TLH Massive uterus
TLH for large uterus

Proper port placement according to the size of the uterus.

How to plan the trocar
The four-trocar method for performing laparoscopically-assisted vaginal hysterectomy on large uteri

Joong Sub Choi, MD, Young Soo Kyung, MD, Kye Hyun Kim, MD, Kyo Won Lee, MD, and Jong Sul Han, MD

From the Department of Obstetrics and Gynecology, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine (all authors), Seoul, Korea.

Abstract

Background: To assess the feasibility and efficacy of laparoscopically-assisted vaginal hysterectomy (LAVH) for a large uterus with the new trocar technique.

Design: Retrospective clinical study (Canadian Task Force classification II).

Setting: University teaching hospital.

Patients: Thirteen women with a large uterus (≥150 cm3).

Intervention: LAVH with Choi’s 4-trocar method.

Measurements and main results: We reviewed the medical records of 13 patients for age, parity, history of previous abdominal surgery, operative indication, histopathologic diagnosis, mean operative time, weight of the removed uterus, change in the hemoglobin level, hospital stay, and occurrence of any complications. The patient’s median age was 63 years (range 56–71 years), median parity was 2 (range 0–5), and 10 patients (76.9%) had a previous hysterectomy. The most common operative indication was a palpable abdominal mass, and the most common histopathologic diagnosis was leiomyoma. The median operative time was 62.3 minutes (range 57–84 minutes), and the median weight of the removed uterus was 4.35 kg (range 3.00–6.30 kg). The median (range) change in hemoglobin level was 1.6 g/dL (range 0.3–2.8 g/dL). The median hospital stay was 1.0 day (range 2–4 days). The only complication was superficial port site bleeding in one patient. None of the operations were converted to total abdominal hysterectomy.

Conclusion: Choi’s 4-trocar method provided an excellent operative field during LAVH for a large uterus.

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Equipment

- Uterine manipulators
  - Transvaginal
  - Laparoscopic
- Hemostatic devices
- Graspers
- Needle driver

Uterine manipulator
Laparoscopic Manipulators
Intra-operative strategies

- Isolate and ligate main blood vessels first (IP, UA from the origin if possible)
- Minimize back bleeding and keep the field clean.
- Skeletonization and gentle dissection
- Strong uterine manipulator; colpoprop, Rumi. Uterus is heavy and hard to move. First assistance is the best manipulator
Laparoscopic Hysterectomy of Large Uteri With Uterine Artery Coagulation at Its Origin

Horace Raman, MD, Joel Zonai, MD, Ludovic Friederich, MD, Benoit Rech, MD, Eric Lena, MD, Leic Margoulefft, MD, PhD

ABSTRACT

Background: To assess the usefulness for performing total laparoscopic hysterectomy with primary uterine artery coagulation at its origin for a series of women presenting with an enlarged bulky uterus.

Methods: Eighty women having undergone the procedure consecutively during a period of 17 months were studied retrospectively. The inclusion criteria were an enlarged uterine volume weighing more than 200 g, managed by total laparoscopic hysterectomy with primary uterine artery coagulation at its origin.

Results: The median patient, median age, body mass index, and parity were 54.4 (range: 38 to 75), 25 (range: 15 to 35), and 2.5 (range: 0 to 7), respectively. The median value for uterine weight (range) was 500 g (range: 200 to 1,000), and the median duration for the surgical procedure was 105 minutes (range: 90 to 260). The longest procedure was due to associated deep venous thrombosis and uterine adhesions. The duration of the intervention was not significantly correlated with uterine size (correlation coefficient r = 0.03; p = 0.50), and minor or postoperative complications were scored.

Conclusions: The selective coagulation of the uterine artery at its origin is a reproducible technique that allows total laparoscopic hysterectomy in enlarged uterum. This procedure avoids unexpected intraoperative hemorrhage and offers an advantage to the abdominal route and provides rapid protection for the patient.

INTRODUCTION

Hysterectomy remains the most common major gynecological operation and may be carried out by 3 different routes: vaginal, abdominal, and laparoscopic. Charts, in descriptive for dose, trauma should differ, but they could overlap. Although the traditional route is universally considered the most morbid hysterectomy procedure, the vaginal route appears to be the nadir and the least vaginal when it can be safely completed. Moreover, with increasing uterine weight the vaginal route becomes more difficult, especially in nulliparous, and in these patients, the laparoscopic route may allow for a laparoscopic to be avoided. Nevertheless, it should be noted that there are over 2,000 publications on laparoscopic hysterectomy, opinion surrounding its role is greatly divided.

Although many enlarged uteri can be delivered vaginally, by skilled surgeons, the procedure is not always gastric and safe in patients with enlarged uterus. These lesions may be considerable, especially when unscheduled time is required to immobilize the uterus, leading to unavoidable retrograde bleeding. Laparoscopic hysterectomy can be a valid surgical approach in these cases, although a significant complication of the abdominal procedure is to make it safe.12-20 The laparoscopic approach allows the immobilization of litter supplies, thereby reducing postoperative complications and the beginning of chronic infection. The aim of this study is to describe the total laparoscopic hysterectomy technique using primary uterine artery coagulation and to report outcomes that are at least as good as for a series of women with...
All uteruses with possible pathology; endometrial cancer, fibroids, sarcomas… best delivered intact in one piece.

- if morcellation is needed, the uterus needs to be put in a bag
- Pre-operative medication to shrink the fibroid is optional, BUT don’t if you are suspecting malignancy (to avoid delaying the surgery)
Preoperative medication

- Higher pre-op Hgb, improving symptoms, smaller uterus, higher success rate TLH, shorter OT, LOS, EBL.

**Options:**

- **Fibristal** (ulipristal acetate), SPRM*, 5mg tablet OD, 13 weeks, improve all symptoms, 47% reduction in fibroid size. 2 RCT, SE: hot flashes

- **Depot lupon** 11.25/3 month injection +/- concurrent raloxifene: 50-60%, shrinkage, many with HF, insomnia. 2 (not if postmenopausal, not for uteri larger than 18 weeks size...not work)

- **Mifepristone** 5mg/d/6 months: 47% (most reduction in first 3 months). Well tolerated.

- **Anastrazole** 1mg/day/3 months. 56% shrinkage if over age 40.

*Selective progesterone receptor modulator

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**GnRH Agonist Treatment before Total Laparoscopic Hysterectomy for Large Uteri**


**Abstract**

*J Am Assoc Gynecol Laparosc. 16(3):316–319, 2003*

**TABLE 3. Operative and Postoperative Values in the Two Groups**

<table>
<thead>
<tr>
<th></th>
<th>Group A (Tx group)</th>
<th>Group B</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative hemoglobin (g/dl)</td>
<td>12.3 ± 1.4</td>
<td>11.4 ± 1.4</td>
<td>&lt;0.02</td>
</tr>
<tr>
<td>Preoperative uterine volume (ml)</td>
<td>388 ± 193</td>
<td>387 ± 341</td>
<td>&lt;0.003</td>
</tr>
<tr>
<td>Uterine weight (g)</td>
<td>138 ± 165</td>
<td>462 ± 226</td>
<td>&lt;0.02</td>
</tr>
<tr>
<td>Mean operating time (min)</td>
<td>85.3 ± 29.1</td>
<td>115.3 ± 38.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Drop in hemoglobin (g/dl)</td>
<td>1.2 ± 0.8</td>
<td>1.9 ± 1.0</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>Transfusion (mL)</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mean hospital stay (d)</td>
<td>76.3 ± 24.4</td>
<td>80.4 ± 26.5</td>
<td>NS</td>
</tr>
</tbody>
</table>

J Am Assoc Gynecol Laparosc. 2003 Aug
Suspecting a sarcoma, LMS

- Older age 45 and older
- Rapidly growing fibroid, new fibroid
- Singular, poor margins.
- MRI (not typical findings); necrosis, increase vascularity, irregular ill-defined margins
- Elevated total LDH, especially isoenzyme 3.

Goto et al, Int J Gynecol cancer, 2002
Innovation
Delivered a baby boy!!

Summary

- Modifying techniques for Obese will make TLH feasible, safe and more successful.
- TLH for large > 250 uterus is feasible and safe as long as we are performing safe morcellation and removal.
- Uterine artery ligation is feasible and effective.