

STUDY OF THE ECONOMICS GENERATED BY LAPAROSCOPIC APPROACH FOR BENIGN GYNECOLOGICAL DISEASES – an overview

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Uterine myoma represents the most frequent gynecological pathology, being encountered in about 70% of socio-economically active women under age of 50. Surgical treatment is represented by myomectomy or total hysterectomy: abdominal (open approach or laparoscopy) or vaginal technique. Analyzing costs ratio when comparing laparoscopic technique vs. open approach, for uterine myomas. Articles published during 2005-2015 were analyzed, including: randomized controlled studies (RCT), prospective randomized/not studies and metaanalyses. Interest points were: length of stay (LOS), absence from work, quality of life (QOL), pain control and complication rate. 40% of total hysterectomies/myomectomies in Western Europe countries are performed by laparoscopic approach. Complication rate was 2.6 times lower for minimal invasive technique. Median costs per patient were 20% higher for open approach and were influenced by case selection, operating time, pain management or LOS. recently published data are demonstrating clear advantages of minimal invasive surgery on uterine myoma pathology. Projects concerning costs-efficiency and quality of life improvement for socio-economic active women are already implemented in countries from Western Europe. Healthcare services from Romania, should also introduce laparoscopic approach on a larger scale in order to decrease costs and improve the patient's quality of life.

Keywords: myoma, hysterectomy, laparoscopy, complication-rate, costs

INTRODUCTION

Uterine myoma represents the most frequent gynecological pathology, being encountered in about 70% of socio-economically active women under the age of 50. Uterine myomatosis is an abnormal and benign proliferation of myometrial elements, surrounded by a capsule. Symptoms can be invalidating and represented by: important bleeding, fatigue and dismenorhea. Judging by the case, surgical treatment is represented by myomectomy or total hysterectomy: abdominal (open approach or laparoscopy) or vaginal technique. The objective of this study was to analyse and compare minimal invasive techniques to open abdominal hysterectomy (AH). The cost ratios were studied when comparing laparoscopic technique vs. open approach, for uterine myomas and finally we searched the literature and tried to find and answer for the question: is there a place for robot and what are the costs for that?

MATERIAL AND METHODS

Articles published between 2005-2015 were analysed: randomized controlled trials (RCT), studies prospective randomized/not and meta analyses Interest points were

represented by: length of stay (LOS), time of absence from work, quality of life (QOL), pain control and complication rate.

RESULTS AND DISCUSSIONS

From the point when was available more than one option for surgical approach, appeared the need for evaluation of conversion risk and also for choosing the proper surgical approach¹⁻². A preoperative scoring system was created, from zero to five points:

- for previous laparoscopy was assigned 1 point,
- previous Pfannenstiel laparotomy were assigned 2 points,
- previous one cesarean delivery were assigned 3 points,
- previous two cesarean deliveries were assigned 4 points,
- previous three cesarean deliveries were assigned 5 points
- no previous operations were assigned 0 points.

In a German study performed in Gynecological Endoscopy University Clinic and published in 2015 there were analysed 953 women with complete data. From the perspective of preoperative score the data revealed that mean preoperative score was 1.09 ± 1.51 for abdominal hysterectomy (AH), 0.75 ± 0.96 for vaginal hysterectomy

(VH), 1.04 ± 1.30 for laparoscopic supracervical hysterectomy (LSH), 1.0 ± 1.40 for laparoscopic assisted vaginal hysterectomy (LAVH) and 1.38 ± 1.52 for total laparoscopic hysterectomy (TLH). Most frequent scores in the VH were 0 and 1; LASH and TLH showed a prevalence over VH in the preoperative scores 3 and 4; AH showed a prevalence over the minimal invasive methods in the preoperative score 3-8. **Intraoperative complications** were present in 28 of 953 (2.9 %) cases: 10 (35.7 %) cases for **VH**, 13 (46.4 %) cases for **AH**, 3 (10.7 %) cases of **LSH**, 1 (3.6 %) case of LAVH and 1 (3.6 %) case of **TLH**. As expected, intraoperative complications were statistically significant more frequent in heavier weight uterus.

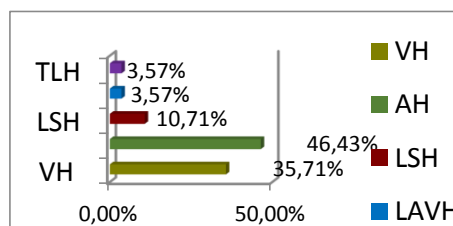


Figure 1. Intraoperative complications when reported to surgical approach

Postoperative complications occurred in 17 of 953 (1.8 %) cases and minor postoperative complications were recorded in 56 of 953 (5.9 %) hysterectomies. Operation duration, hospital stay and hemoglobin decline correlated significantly with preoperative score ($P < 0.001$).

When comparing minimal invasive techniques to open approach there is a high number of published papers³. Looking in Europe, one of the newest studies comes from Germany, retrospective study, analysing patients who underwent hysterectomy patients between 2002 and 2010. Highest postoperative complication rates were for: 11.8% for LSH and 23.5% for AH; highest intraoperative complication rate: AH - 46.4% while lowest was for TLH - 3.6%.

An american retrospective cohort study, published 2012 took into consideration 957 minimal invasive operated patients: laparoscopic supracervical (LSH), total (TLH), and assisted vaginal (LAVH) hysterectomies. From 957 LH: 799 (83.5%) were LSH, 62 (6.4%) TLH, and 96 (10.1%) LAVH⁴. The decision for the surgical technique was based on the antecedent gynaecologic conditions: postmenopausal bleeding LAVH vs. LSH, odds ratio (OR) 2.20; 95% confidence interval (CI) 1.04-4.65, previous pelvic surgery (TLH vs. LSH, OR 1.92; CI 1.05-3.52), previous cesarean delivery (LAVH vs. LSH, OR 0.39; CI 0.21-0.76) and prior hysteroscopy (LAVH vs. LSH, OR 0.29; CI 0.16-0.50). Estimated blood loss, operating time, and length of hospital stay were significantly reduced with

LSH. LSH was the most common approach and was associated with significantly less morbidity.

Considering that technology advances so fast and the number of options for minimal invasive approach is constantly increasing, a normal question arises: is it important to be operated by a dedicated endoscopist surgeon?⁵. The costs to perform a hysterectomy are widely variable. A prospective study from South Korea, published in 2014 took into consideration whether traditionally open surgeons lower costs when performing laparoscopy versus robotic hysterectomy. There were 4,871 hysterectomies performed: 34.2% open, 50.7% laparoscopic, and 15.1% robotic. Laparoscopic hysterectomy had the lowest total costs and was also statistically significant. In the same time, laparoscopic hysterectomy performed by open surgeons had higher costs than laparoscopic surgeons. Open surgeons had lower costs performing laparoscopic hysterectomy than robotic hysterectomy with robotic maintenance and depreciation included ($P < .001$) but similar costs if these variables were excluded.

Even though in Europe the robot is not so widely spread compared to USA, utilization of robotically assisted hysterectomy for benign gynaecologic conditions is increasing⁶. A 2013 published article studying women undergoing robotic or laparoscopic hysterectomy for benign disease in United States between 2009 and 2010 based on Nationwide Inpatient Sample. Differences in in-hospital complications, hospital length of stay, and hospital charges were assessed between the matched groups. 804,551 hysterectomies for benign conditions: 20.6% laparoscopic vs 5.1% robotically-assisted. Overall complication rates were similar: robotic vs laparoscopic hysterectomy (8.80 vs. 8.85%; relative risk [RR], 0.99; 95% confidence interval [CI], 0.89 to 1.09; $P=0.910$).

There was lower incidence of blood transfusions in robotic cases (2.1% vs. 3.1%; $P<0.001$), but patients undergoing robotic hysterectomy were more likely to experience postoperative pneumonia (RR= 2.2; 95% CI, 1.24 to 3.78; $P=0.005$). Median cost of hospital care was \$9788 (IQR, \$7105-\$12780) for RH and \$7299 (IQR, \$5650-\$9583) for LH ($P<0.001$). Perioperative outcomes were similar between laparoscopic and robotic hysterectomy, but per total, robotic cases costed substantially more.

Another paper published on the same topic tried to estimate the incidence of operative complications and compare operative cost and overall cost of different methods of benign hysterectomy including abdominal, vaginal, laparoscopic, and robotic techniques⁷. It is a retrospective cohort analysis for patients with hysterectomy for benign reasons operated in 2009 and the cost data were gathered from the hospital's billing system. 688 hysterectomies were analysed: 185 (26.9%) abdominal hysterectomies, 135 (19.6%) vaginal, 352

(51.5%) laparoscopic and 14 (2.0%) robotic. Results showed: intraoperative complication rate - 1.7% for abdominal, 0.8% for vaginal, 0.3% for laparoscopic, and 0 for robotic; - mean total patient costs: \$43,622 for abdominal, \$31,934 for vaginal, \$38,312 for laparoscopic, and \$49,526 for robotic hysterectomies; - for the minimally invasive techniques of hysterectomy, patient costs were significantly influenced by the method of hysterectomy.

When trying to increase the effectiveness of minimal invasive surgery⁸, an idea popped out: a multidisciplinary care program on recovery and return to work⁹. That is an ongoing randomized controlled trial in Holland designed to assess the effect of the multidisciplinary care program on full sustainable return to work after gynaecological surgery. Till this date there were enrolled 212 women (18-65 years old) whom were operated: hysterectomy and/or laparoscopic adnexal surgery on benign indication. Primary outcome measure is sick leave duration until full sustainable return to work and secondary outcome measures the effect of the care program on general recovery, quality of life, pain intensity and complications. There is strong evidence that long periods of sick leave can result in work disability, poorer general health and increased risk of mental health problems. Risk factors for conversion during the laparoscopic approach are analysed in order to elaborate.

Even though there is a large amount of literature concerning minimal invasive surgery for benign gynaecological pathology, it is very heterogeneously distributed and the level of evidence is generally small. Most of the studies are retrospective or based on national databases. First of them have a low level of evidence and the second have the disadvantage of operations performed by completely different surgical teams with completely different caseload per year. As an example already presented are the papers published on the costs per patient with high differences between the two of them¹⁰⁻¹¹. So, there is a huge space for starting and conducting prospective studies with very well structured protocols.

CONCLUSIONS

Recently published data are demonstrating the advantages of minimal invasive surgery on uterine myoma pathology regarding morbidity and economics. Analysis and projects concerning costs-efficiency and quality of life improvement for socio-economic active women are ongoing. Healthcare services from Romania, should also introduce laparoscopic techniques on a larger scale in order to decrease the costs and to improve the patient's quality of life.

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