

Hysterectomy in Poland between 2011 and 2016. Changing trends in the surgical approach to hysterectomy

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ABSTRACT

Objectives: In Poland, approximately 35,000 women a year undergo hysterectomy. The surgical approach may vary depending on the indications and experience of the operator and advances in laparoscopic surgical techniques. The aim of the present study was to analyze trends in the use of various types of hysterectomy in Poland between 2011 and 2016. Summary values were given as numbers and percentages. Annual incidence of procedures and identify factors which influence these changes in gynecological practice.

Material and methods: Data on hysterectomy procedures performed between 2011 and 2016 in Poland acquired from the National Health Fund reports were extracted and analyzed. Summary values were given as numbers, percentages and rate ratios (RR). Annual incidence of procedures and identify factors that influence these changes in gynecological practice.

Results: Between 2011 and 2016, 215,744 women were treated by hysterectomy in inpatient settings. The total number of those procedures in analyzed period decreased by 11.5%; the incidence rate dropped by 2.15 per 100,000 women. A significant increase in laparoscopic procedures was observed (RR = 3.85; CI: 3.57–4.16; $p < 0.001$) along with a decrease in the number of abdominal operations (RR = 0.82; CI: 0.81–0.83; $p < 0.001$).

Conclusions: Surgical technique advances, introduction of intrauterine systems and hormonal therapy, as well as recommendations of international institutions have brought about changes in the methods and frequency of hysterectomy. The laparoscopic approach has been gaining popularity since it is beneficial both for patients and public health system. However, the percentage of advanced minimally invasive hysterectomies is still low in Poland in comparison to other countries.

Key words: hysterectomy, statistics, laparoscopy, Poland

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INTRODUCTION

Hysterectomy is one of the most commonly performed gynecological procedures worldwide. According to the data acquired from the National Health Fund (NHF), approximately 35,000 women a year undergo this procedure. The most frequent indications for hysterectomy apart from neoplastic diseases of the reproductive organs are uterine fibroids, abnormal uterine bleeding, pelvic organ prolapse and endometriosis [1]. Considering the anatomical extent of hysterectomy, the procedures can be divided into total hysterectomy (TH) and

supracervical hysterectomy (SH). The surgical approach is chosen based on the indication for hysterectomy and experience of the operator. In the case of total hysterectomy, abdominal or vaginal approach can be applied. Abdominal surgeries can be divided into open and laparoscopic. SH can be carried out using the abdominal approach (laparotomy or laparoscopy).

Over the years, various medical trends influenced the number and type of the performed surgeries in gynecology [2]. Initially, the conservative treatment with a limited role of surgery was popular [3, 4]. Introduction of the embolization

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of the uterine arteries into the treatment of benign tumors of the uterus and other non-operative methods of ablation into the treatment of abnormal uterine bleeding made these methods more common [5]. Similarly, conservative treatment is often chosen in cervical dysplasia. A considerable increase in the use of procedures aimed at sparing the uterus and patient fertility is widely observed [6]. Another aspect is the development of minimally invasive techniques. Almost three decades have passed since the first laparoscopic hysterectomy was carried out but rapid implementation of this surgical method can be observed in many countries [7, 8].

Recently, considerable changes in the operative modalities as well as qualification procedures to treatment of gynecological diseases have been observed also in Poland. However, our knowledge on how these trends affected the frequency of the performed hysterectomies is limited. Therefore, we analyzed the reports from the National Health Fund to evaluate the number and type of operations on the female reproductive organ.

Objectives

The aim of the present study was to analyze trends in the use of various types of hysterectomy in Poland between 2011 and 2016.

MATERIAL AND METHODS

In the present study, we used National Health Fund (NFZ — *Narodowy Fundusz Zdrowia*) data because it is the biggest and essentially the only public payer of health services in Poland. Information from the National Health Fund databases is a source of reliable knowledge about medical procedures performed in Poland. National Health Fund performs the analysis of Diagnosis-Related Groups (JGP — *Jednorodne Grupy Pacjentów*) annually. The summary encompasses the number of surgical procedures performed, primary diagnosis according to the International Statistical Classification of Diseases and Related Health Problems (ICD-10) and medical procedures according to the International Classification of Procedures in Medicine (ICD-9).

Data on the gynecological treatment performed between 2011 and 2016 were collected and analyzed. Special attention was given to the number of performed hysterectomies and to the type of such surgeries. Patients were divided

into five groups depending on the type of hysterectomy: total abdominal hysterectomy (TAH), total laparoscopic hysterectomy (TLH), supracervical abdominal hysterectomy (SAH), supracervical laparoscopic hysterectomy (SLH), and vaginal hysterectomy (VH).

The data were statistically analyzed using the R Project for Statistical Computing v. 3.2.2. The analysis encompassed the annual number of the procedures and the population of women in given years in Poland. They were presented as numbers and percentages. The annual incidence of the procedures and the rate ratios (RR) were calculated to enable objective comparison between the procedures.

RESULTS

Over the study period, 215,744 women were treated with hysterectomy in the inpatient settings. Between 2011 and 2015, a regular decrease in the number of hysterectomies in Poland was observed. In 2015, the number of the procedures was lower by 13.0% (n=4898) in comparison to 2011. In 2016, an increase by 1.7% (n = 558) was observed in comparison to 2015. In the entire analyzed period, the total number of hysterectomies dropped by 11.5 % in comparison to reference year, i.e. 2011 (Fig. 1). A decreasing trend is also visible in the analysis of the incidence of hysterectomy per 100,000 women in Poland (Tab. 1).

A significant drop in the number of TAH was observed. It decreased from 24,626 in 2011 to 18,711 in 2016 what is the decrease by 24.0% (RR = 0.76; CI: 0.75–0.78; p < 0.001). In case of TLH, there is a considerable increase from 62 proce-

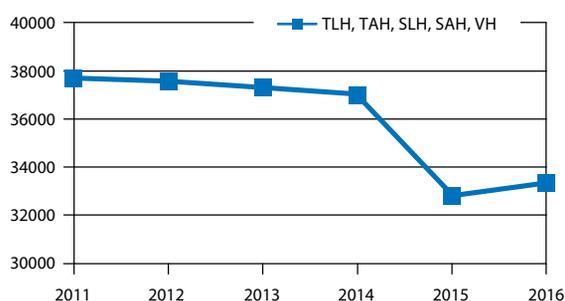


Figure 1. Total number of hysterectomies; TAH — total abdominal hysterectomy; TLH — total laparoscopic hysterectomy; SAH — supracervical abdominal hysterectomy; SLH — supracervical laparoscopic hysterectomy; VH — vaginal hysterectomy

Table 1. Annual incidence of the total number of hysterectomies

	2011	2012	2013	2014	2015	2016
Total number of women	19,883,870	19,883,965	19,866,124	19,858,793	19,839,248	19,839,826
Total number of all hysterectomies	37 700	37 547	37 318	37 017	32 802	33 360
Incidence rate per 10,000 women	18.96	18.88	18.78	18.64	16.53	16.81

dures in 2011 to 802 procedures in 2016 what is the increase by 1,193.5% (RR = 12.96; CI: 10.01-16.79; $p < 0.001$). Those trends are presented in Figure 2 and Table 2.

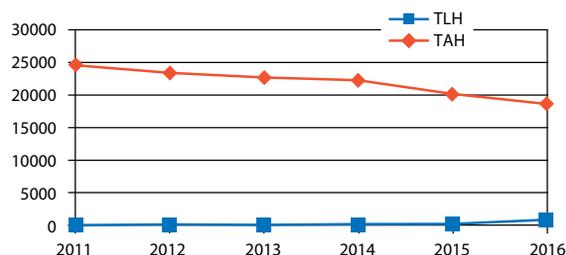


Figure 2. Comparison of the number of total abdominal and laparoscopic hysterectomy procedures; TAH — total abdominal hysterectomy; TLH — total laparoscopic hysterectomy

Over the study period, 66,285 SAH procedures were performed. After initial increase by 7.1% from 10,738 in 2011 to 11,501 in 2014 (RR = 1.07; CI: 1.04–1.10; $p < 0.001$), their number decreased from 11,501 in 2014 to 10,282 in 2016 what is the decrease by 10.6% (Tab. 3).

In case of SLH, an increasing trend was observed as their number rose from 788 in 2011 to 1,983 in 2014 what is the increase by 151.6% (RR = 1.07; CI: 1.04–1.10; $p < 0.001$). Annual changes in SLH are presented in Table 3. In 2015, there was the lowest number of SLH performed. Their number dropped from 1,983 in 2014 to 632 in 2015 what is the decrease by 68.1% (RR = 0.32; CI: 0.29–0.35; $p < 0.001$). Next, an increase by 262.2% in the number of SLH procedures was observed. Their number rose from 632 in 2015 to 2289 in 2016 (RR = 3.62; CI:

Table 2. Comparison of the number of total hysterectomy procedures with abdominal and laparoscopic approach. Rate ratio is calculated in relation to 2011 as the reference year

	2011	2012	2013	2014	2015	2016
Total number of women	19,883,870	19,883,965	19,866,124	19,858,793	19,839,248	19,839,826
TAH	24626	23398	22744	22243	20121	18711
TLH	62	73	35	117	166	802
TAH incidence per 10,000 women	12.38	11.77	11.45	11.20	10.14	9.43
TLH incidence per 10,000 women	0.03	0.04	0.02	0.06	0.08	0.40
TAH rate ratio with CI		RR = 0.95 CI: 0.93–0.97; $p < 0.001$	RR = 0.92 CI: 0.09–0.09 $p < 0.001$	RR = 0.90 CI: 0.89–0.92 $p < 0.001$	RR = 0.82 CI: 0.80–0.83 $p < 0.001$	RR = 0.76 CI: 0.75–0.78 $p < 0.001$
TLH rate ratio with CI		RR = 1.18 CI: 0.84–1.65 $p = 0.3438$	RR = 0.57 CI: 0.37–0.86 $p = 0.006$	RR = 1.89 CI: 1.39–2.57 $p < 0.001$	RR = 2.68 CI: 2.00–3.59 $p < 0.001$	RR = 12.93 CI: 10.01–16.79 $p < 0.001$

TAH — total abdominal hysterectomy; TLH — total laparoscopic hysterectomy; CI — confidence interval; RR — rate ratio

Table 3. Comparison of the number of supracervical hysterectomy procedures with abdominal and laparoscopic approach. Rate ratio is calculated in relation to 2011 as the reference year

	2011	2012	2013	2014	2015	2016
Total number of women	19,883,870	19,883,965	19,866,124	19,858,793	19,839,248	19,839,826
SAH	10738	11412	11665	11501	10687	10282
SLH	788	1225	1582	1983	632	2289
SAH incidence per 10,000 women	5.40	5.74	5.87	5.79	5.39	5.18
SLH incidence per 10,000 women	0.40	0.62	0.80	1.00	0.32	1.15
SAH rate ratio with CI		RR = 1.06 CI: 1.04–1.09; $p < 0.001$	RR = 1.09 CI: 1.06–1.12 $p < 0.001$	RR = 1.07 CI: 1.04–1.10 $p < 0.001$	RR = 1.00 CI: 0.97–1.02 $p = 0.854$	RR = 0.96 CI: 0.93–0.99 $p = 0.0028$
SLH rate ratio with CI		RR = 1.55 CI: 1.42–1.70 $p < 0.001$	RR = 2.01 CI: 1.84–2.19 $p < 0.001$	RR = 2.51 CI: 2.32–2.74 $p < 0.001$	RR = 0.80 CI: 0.72–0.89 $p < 0.001$	RR = 2.91 CI: 2.68–3.16 $p < 0.001$

SAH — supracervical abdominal hysterectomy; SLH — supracervical laparoscopic hysterectomy; CI — confidence interval; RR — rate ratio

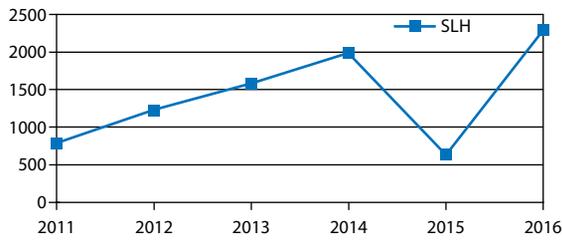


Figure 3. Number of supracervical laparoscopic hysterectomy (SLH) procedures

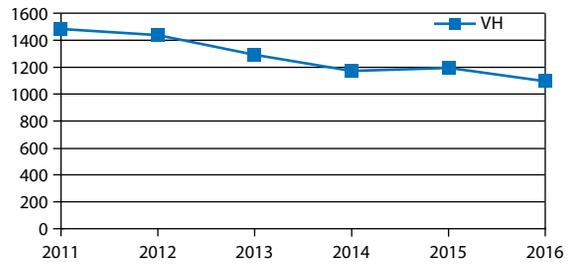


Figure 4. Total number of vaginal hysterectomies (VH)

Table 4. Comparison of the surgical approaches of hysterectomy. Rate ratio for a given year is calculated with a preceding year as the reference year

	2011	2012	2013	2014	2015	2016
Total number of women	19,883,870	19,883,965	19,866,124	19,858,793	19,839,248	19,839,826
TAH	24626	23398 RR = 0,95 CI: 0,93–0,97 p < 0,001	22744 RR = 0,97 CI: 0,96–0,99 p = 0,0032	22243 RR = 0,98 CI: 0,96–1,00 p = 0,0202	20121 RR = 0,91 CI: 0,89–0,92 p < 0,0001	18711 RR = 0,93 CI: 0,91–0,95 p < 0,0001
TLH	62	73 RR = 1,18 CI: 0,84–1,65 p = 0,3438	35 RR = 0,48 CI: 0,32–0,72 p < 0,0001	117 RR = 3,34 CI: 2,29–4,88 p = 0,0003	166 RR = 1,42 CI: 1,12–1,80 p = 0,0035	802 RR = 4,83 CI: 4,09–5,71 p < 0,0001
SAH	10738	11412 RR = 1,06 CI: 1,04–1,09 p < 0,001	11665 RR = 1,02 CI: 1,00–1,05 p = 0,0830	11501 RR = 0,99 CI: 0,96–1,01 p = 0,2940	10687 RR = 0,93 CI: 0,91–0,95 p < 0,001	10282 RR = 0,96 CI: 0,94–0,99 p = 0,0051
SLH	788	1225 RR = 1,55 CI: 1,42–1,70 p < 0,001	1582 RR = 1,29 CI: 1,20–1,39 p < 0,001	1983 RR = 1,25 CI: 1,17–1,34 p < 0,001	632 RR = 0,32 CI: 0,29–0,35 p < 0,001	2289 RR = 3,62 CI: 3,32–3,96 p < 0,001

SAH — supracervical abdominal hysterectomy; TLH — supracervical laparoscopic hysterectomy; TAH — total abdominal hysterectomy; TLH — total laparoscopic hysterectomy; CI — confidence interval; RR — rate ratio

Table 5. Comparison of the number of total and supracervical hysterectomy procedures with abdominal and laparoscopic approach

	2011	2012	2013	2014	2015	2016
TAH + SAH	35364	34810	34409	33744	30808	28993
TLH + SLH	850	1298	1617	2100	798	3091
TLH + SLH %	2.35%	3.59%	4.49%	5.85%	2.52%	9.63%

SAH — supracervical abdominal hysterectomy; TLH — supracervical laparoscopic hysterectomy; TAH — total abdominal hysterectomy; TLH — total laparoscopic hysterectomy; CI — confidence interval; RR — rate ratio

3.32–3.96; $p < 0.001$). Data regarding SLH is presented in Table 3 and Figure 3.

In the analyzed period, the total number of VH reached 7,684. However, a drop by 26.1% was observed between 2011 and 2016 (1,486 vs 1,098). The annual trend in VH is presented in Figure 4. Additionally, significant increase in minimally invasive procedures was observed. Between 2011 and 2016, the total number of both TLH and SLH increased significantly (RR = 3.85; CI:

3.57–4.16; $p < 0.001$) along with a decrease in the number of surgeries with abdominal approach (RR = 0.82; CI: 0.81–0.83; $p < 0.001$). The ratio of minimally invasive surgeries (TLH and SLH) to surgeries performed with the laparotomy approach (TAH and SAH) in the subsequent years was 2.3%, 3.5%, 4.4%, 5.8%, 2.5%, and 9.6%. A comparison of the surgeries with laparoscopic and abdominal approach is presented in Table 5, 6 and Figure 5.

Table 6. Comparison of the number of total and supracervical hysterectomy procedures with abdominal and laparoscopic approach. Rate ratio is calculated in relation to 2011 as the reference year

	2011	2012	2013	2014	2015	2016
Total number of women	19,883,870	19,883,965	19,866,124	19,858,793	19,839,248	19,839,826
TLH + SLH	850	1298	1617	2100	798	3269
TAH + SAH	35364	34810	34409	33744	30808	28993
TLH + SLH Incidence rate per 10.000 women	0.43	0.65	0.81	1.06	0.40	1.65
TAH + SAH Incidence rate per 10.000 women	17.79	17.51	17.32	16.99	15.53	14.61
TLH + SLH rate ratio with CI		RR = 1.53 CI: 1.40–1.67 p < 0.001	RR = 1.90 CI: 1.75–2.07 p < 0.001	RR = 2.47 CI: 2.28–2.68 p < 0.001	RR = 0.94 CI: 0.85–1.04 p = 0.2167	RR = 3.85 CI: 3.57–4.16 p < 0.001
TAH + SAH rate ratio with CI		RR = 0.98 CI: 0.97–1.00 p = 0.0364	RR = 0.97 CI: 0.96–0.99 p = 0.0005	RR = 0.96 CI: 0.94–0.97 p < 0.001	RR = 0.87 CI: 0.86–0.89 p < 0.001	RR = 0.82 CI: 0.81–0.83 p < 0.001

SAH — supracervical abdominal hysterectomy; TLH — supracervical laparoscopic hysterectomy; TAH — total abdominal hysterectomy; TLH — total laparoscopic hysterectomy; CI — confidence interval; RR — rate ratio

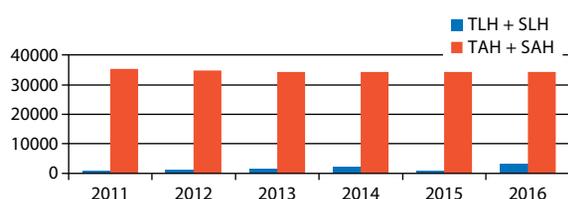


Figure 5. Comparison between the number of total abdominal and laparoscopic hysterectomy procedures; TAH — total abdominal hysterectomy; TLH — total laparoscopic hysterectomy; SAH — supracervical abdominal hysterectomy; SLH — supracervical laparoscopic hysterectomy

Comparison of the percentage of advanced minimally invasive hysterectomies between countries based on national database reports is presented in Table 7.

DISCUSSION

Data presented in the study indicate that the number of hysterectomy procedures was decreasing gradually between 2011 and 2016 in Poland. Despite a small increase by 1.7% in 2016 in comparison to the preceding year, the total drop in those procedures accounted for 11.5%. Changes observed in Poland are similar to those reported in the USA and other European countries [4, 6, 9, 10].

In the present study, a significant reduction in the number of TAH by 24.0% accompanied by an increase in the number of TLH by 1,193.5% over the study period suggests a positive change in Polish gynecology. Despite the fact that a laparoscopic procedure is usually longer in comparison to the time needed for the classical approach, benefits for the patients are invaluable. Advantages of laparoscopy include lower intraoperative blood loss, lower demand for analgesics, shorter hospital stay, and shorter recovery period after

Table 7. Comparison of the percentage of advanced minimally invasive hysterectomies between countries based on national database reports

	2010	2011	2012	2013	2014
USA	26.10%	32.00%	38.50%	43.40%	
Poland		2.35%	3.59%	4.49%	5.85%
Austria					32.00%

the operation compared to a surgery with the abdominal approach [11–13]. Growing experience in laparoscopy among the physicians offers all the advantages of minimally invasive operations also for obese patients and patients with very large fibroids (over 1,000 g) [14–16]. Despite an increase in the percentage of laparoscopic surgeries in relation to abdominal surgeries in Poland from 2.3% in 2011 to 9.6% in 2016, still a lot of work and focus on the training of the physicians are needed to come close to the result of 2.0% in Austria in 2014 or USA 43.4% in 2013 [17] (Tab. 7).

The initial increase in the number of SLH till 2014 with the subsequent rapid drop by 68.1% to the lowest number of 632 procedures in 2015 was most likely associated with safety warnings issued by the American Food and Drug Administration regarding the use of morcellation at the end of 2014 despite the lack of any official opinion of Polish scientific societies [18, 19]. The impact of the recommendations in force in the USA significantly changed the daily practice among both Polish and American practitioners. Retrospective study covering 603 hospitals in US showed an increased rates of open surgery and decreased rate of minimally invasive surgery. In addition significant increased in minor complications as well as major compli-

cation was observed from 2.7% to 3.3% and from 1.9% to 2.4% respectively [20]. Advances in the operative techniques resulted in the development of a special intraperitoneal bag to prevent uncontrolled tissue dissemination during morcellation. Additionally, recommendations of the European Society of Gynecological Oncology on fibroid and uterine morcellation resulted in subsequent increase (by 262.2%) in the number of SLH in 2016 [21, 22]. Reports from the literature showed that careful preoperative counseling further reduces the risk of unexpected malignancies in the uterus and confirmed safety of morcellation in selected group of patients [23].

A drop by 26.1% in the number of VH in Poland unfortunately reflects the reduction in the popularity of this procedure in our country. This drop, however, does not change the fact that using proper technique and qualification, this type of hysterectomy is a method of choice for benign gynecological diseases in many gynecological centers. It is especially beneficial considering the complications rate and cost-effectiveness of the procedure. [14, 24–26] Benefits of advanced minimal surgery has been proven in meta-analysis of studies in comparison of total laparoscopic hysterectomy to the total abdominal hysterectomies. Despite a longer operating time in laparoscopic group (weighted mean differences -WMD 22 min; 95% CI 5–39 min; $p = 0.01$), minimally invasive techniques benefit in peri-operative complications (pooled OR 0.19; 95% CI 0.07–0.50), reduced estimated blood loss (WMD –183 mL; 95% CI –346 mL to –21 mL ; $p = 0.03$), as well as shorter hospital stay (WMD –2.5 days; 95% CI –5.1 days to 0.01 days; $p = 0.05$) and post-operative haematoma formation (pooled OR 0.17; 95% CI 0.03–1.01) compared to TAH [27].

Changes observed in numbers of gynecological procedures between 2011–2016 in Poland reflect the changes in gynecological practice in response to new therapeutic possibilities and recommendations issued by international institutions like American Food and Drug Administration and the European Society of Gynecological Oncology Introduction of new pharmacotherapies and intrauterine systems to gynecological treatment is easier than training a specialist to perform safe laparoscopic hysterectomy. A growing number of laparoscopic procedures in our country is of course, a good sign but the gap between Poland and other leading countries highlights the need for a change in our traditional approach. More emphasis should be placed on including minimally invasive hysterectomy in the specialization training. In light of the increasing availability of endoscopic equipment in gynecological centers in our country and a growing number of specialists trained in minimally invasive hysterectomy during numerous operational courses in leading endoscopic centers, the percentage of advanced minimally invasive procedures for hysterectomy will hope-

fully increase further in the coming years. This trend could be accelerated if the National Health Fund financially favored minimally invasive surgeries; that strategy would be also beneficial for a Polish taxpayer by reducing absenteeism in a workplace after minimally invasive surgeries; and if more emphasis were put on improving the ability to perform such operations during specialization training of the young physicians.

CONCLUSIONS

Technological advances, introduction of the intrauterine systems and hormonal therapy, as well as recommendations of various international institutions brought about changes in the methods and frequency of hysterectomy. The laparoscopic approach is steadily gaining popularity due to its benefits for the patients, chief among them lower intraoperative blood loss, and demand for analgesics, shorter hospitalization, and recovery period, as well as benefits for employers such as shorter absence from work. However, the percentage of minimally invasive surgeries in Poland is still low in comparison to other countries.

Acknowledgments

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Limitations of our study

The limitation of our analysis is to include procedures financed by NFZ. The analysis does not include procedures performed at the patient's expense, as they are not reported to the NFZ.

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