

# Hysterectomy trends for benign indications over a 15-year period in an academic teaching center in Poland: a retrospective cohort study

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## ABSTRACT

**Objectives:** The aim of the study was to evaluate changes in the operative trends for various types of hysterectomy due to benign indications, between 2001 and 2015, at the 2<sup>nd</sup> Department of Gynecology, Medical University of Lublin, as compared to the National Health Service (NHS) registry in Poland.

**Material and methods:** A retrospective cohort study was conducted. Data from the Internal Hospital Discharge Registry and Pathological Results Registry have been compared to the NHS database, which has been available nationwide since 2009.

**Results:** The study group included 5629 women who underwent hysterectomy due to benign indications. During the study period, the following number of procedures were performed: total abdominal hysterectomy — 344 (6.11%), total abdominal hysterectomy with bilateral salpingo-oophorectomy — 1760 (31.27%), total vaginal hysterectomy — 563 (10.00%), subtotal abdominal hysterectomy — 2536 (45.05%), and laparoscopically-assisted subtotal hysterectomy (LASH) — 426 (7.57%). The abdominal route, with the preference for subtotal abdominal hysterectomy, was the main approach to hysterectomy. Symptomatic fibroids were the most common indication for the procedure. Comparison of data collected over the last five years revealed a significant difference in the approach to hysterectomy in favor of subtotal abdominal hysterectomy (SAH) and LASH.

**Conclusions:** Less invasive techniques of hysterectomy (LASH, SAH), which are the preferred choice at the 2<sup>nd</sup> Department of Gynecology (Lublin), are safe and effective options of treating benign conditions. We are of the opinion that these approaches should be offered to patients instead of more radical techniques. Proper training of physicians may influence the decision-making process in favor of minimally invasive techniques.

**Key words:** laparoscopy, hysterectomy, operative trends

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## INTRODUCTION

Hysterectomy following a cesarean section is the second most common gynecological surgery in the world [1]. It is essential to collect information about the main indications, outcome, and postoperative quality of patient life, as it could modify the clinical approach to this procedure in the future. According to a recent report from the Organization for Economic Co-operation and Development (OECD) on 'International variations in a selected number of surgical procedures' among OECD countries, a statistically significant decrease in hysterectomy rates has been

reported in New Zealand, Australia, Canada, and the USA. However, such a trend has not been observed in Europe. Although the rates vary between and within countries, it has been estimated that approximately 5.5 hysterectomies per 1000 women are performed in the USA, 3.3/1000 in Australia, 1.14/1000 in Mexico, 4.2/1000 in the United Kingdom, 5.26/1000 in Norway, and 5.0/1000 in Poland, annually. Uterine fibroids, abnormal uterine bleeding (AUB), pelvic organ prolapse (POP), and endometriosis constitute over 90% of all surgical indications for hysterectomy [1–4]. In the past, other benign conditions like ovarian cysts and pelvic

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pain were also considered as indications for uterine removal. However, hysterectomy rates have been slowly decreasing recently due to the availability of less invasive techniques for treating myomas or abnormal uterine bleeding, including endoscopy procedures, arterial embolization, hormonal therapy, and percutaneous laser thermoablation [5]. In some cases, emergency hysterectomy must be performed due to postpartum hemorrhage, pyometra with no response to antibiotic treatment, and excessive uterine bleeding with no success of other therapeutic options [6].

Traditionally, hysterectomy has been performed via the abdominal route (total — TAH), with or without bilateral salpingo-oophorectomy (TAH/BSO), and subtotal abdominal hysterectomy (SAH), or via the vaginal routes: total vaginal hysterectomy (TVH) or laparoscopically-assisted vaginal hysterectomy (LAVH), or subtotal hysterectomy (LASH) (Figure 1). Recent data have suggested a steady increase in hysterectomies using minimal-access techniques (e.g. total or subtotal laparoscopic hysterectomy performed entirely via the laparoscopic route). It is one of the most complex types of laparoscopic surgical approaches in gynecology, requiring the highest level of surgical expertise [7]. At present, most hysterectomies worldwide are performed via the abdominal route, despite numerous recommendations for the main surgical approach to hysterectomy to be vaginal or laparoscopic. Vaginal hysterectomy (VH) is recommended as the first choice and should be preferred to abdominal hysterectomy (AH). Other surgical options, including AH and laparoscopic hysterectomy, should be considered only in cases when VH is not technically possible. Although it has been well-documented that the vaginal or laparoscopic approaches are connected with less postoperative pain and fewer complications, more rapid recovery in a hospital, less blood loss, and less cost, approximately 60% of the procedures continue to be performed abdominally. Variations in the surgical techniques have been introduced to reduce operative morbidity and postoperative effects of hysterectomy on the urinary and sexual functions [8–11].

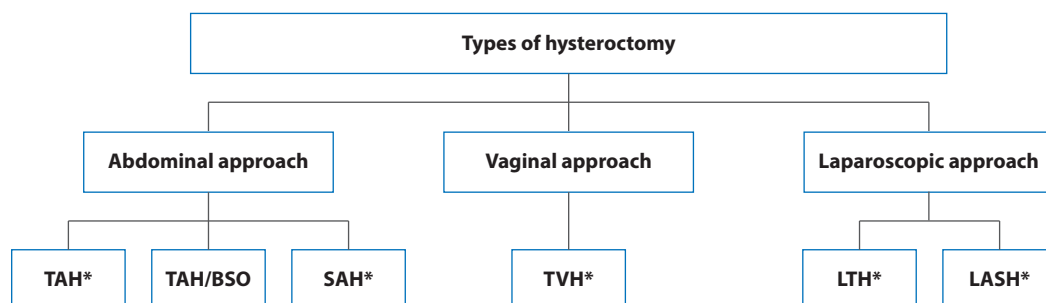
Since 2001, many studies have demonstrated that the Fallopian tube might be the origin of most high-grade ovarian and peritoneal serous carcinomas. Simple modifications in the surgical practice, i.e. prophylactic bilateral salpingectomy, could significantly decrease future mortality rates due to ovarian cancer [11, 12]. In light of these publications, in April 2011, our center introduced prophylactic bilateral salpingectomy with hysterectomies performed via the abdominal and laparoscopic routes. Nevertheless, substantial variations in the preferred mode of elective hysterectomy continue to persist [4, 13–16].

## OBJECTIVES

The aim of the study was to analyze the changing trends in surgical approach to hysterectomy at the 2<sup>nd</sup> Department of Gynecology, Medical University of Lublin, between 2001 and 2015, in comparison to the nationwide trend analysis of the National Health Services (NHS) database. These findings aim to encourage further enquiry and broaden our understanding of the need for appropriate guidelines and focus on adequate gynecological training.

## MATERIAL AND METHODS

The NHS Registry in Poland for operative procedures in gynecology was established in 2009. No earlier national combined data have been available. For that reason, a retrospective study based on the hospital registry of internal surgical interventions and postoperative histological results of patients who underwent hysterectomy at the 2<sup>nd</sup> Department of Gynecology, Medical University of Lublin (Poland), from January 1, 2001 to December 31, 2015, has been performed. A form was designed especially for the purpose of the study and included the following information: dates of hospital admission and discharge, main diagnosis, and type of surgical intervention, recorded according to the International Classification of Disease (ICD-10 and ICD-9). Indications for hysterectomy were determined using the ICD-9 and ICD-10 nomenclature and grouped into: menor-



**Figure 1.** Types of hysterectomy. \*Since 2011, all hysterectomy types at the 2<sup>nd</sup> Department of Gynecology have been performed together with bilateral salpingectomies; TAH — total abdominal hysterectomy; TAH/BSO — total abdominal hysterectomy with bilateral salpingo-oophorectomy; SAH — subtotal abdominal hysterectomy; TVH — total vaginal hysterectomy; LTH — laparoscopically-assisted hysterectomy; LASH — laparoscopically-assisted subtotal hysterectomy

rhagia, pelvic organ prolapse, uterine fibroids, endometriosis, adenomyosis, endometrial hyperplasia, pelvic pain, and benign ovarian cyst. A total of 6563 cases of hysterectomies were analyzed and further classified into 5 groups according to surgery type: TAH, TAH with unilateral or bilateral salpingo-oophorectomy — both groups were included into the 'TAH/BSO' category due to highly detailed data, TVH, SAH (since 2011 combined with prophylactic salpingectomy at our Department), and LASH. For the purpose of this study, 934 cases of hysterectomies due to malignant tumors recognized in histopathological exam results have been excluded. We compared our data and results with the Polish national trends using the NHS database, which contains information on patients admitted to all public hospitals in Poland [15].

### Data analysis

Data were analyzed using Microsoft Excel 2010. As stated above, the Internal Hospital Registry covers all cases of hysterectomies performed at the 2<sup>nd</sup> Department of Gynecology, Medical University of Lublin, between 2001 and 2015. Since 2009, the NHS Registry database have included data on all hysterectomy procedures performed in Poland annually.

## RESULTS

A total of 6563 women who underwent various types of hysterectomy were identified. Between 2001 and 2015, a total number of 5629 hysterectomies due to benign conditions were performed at the 2<sup>nd</sup> Department of Gynecology. The main indications for hysterectomy (Table 1) with annual differences between them (Figure 2) and the number of various types of procedures (Table 2) are presented below.

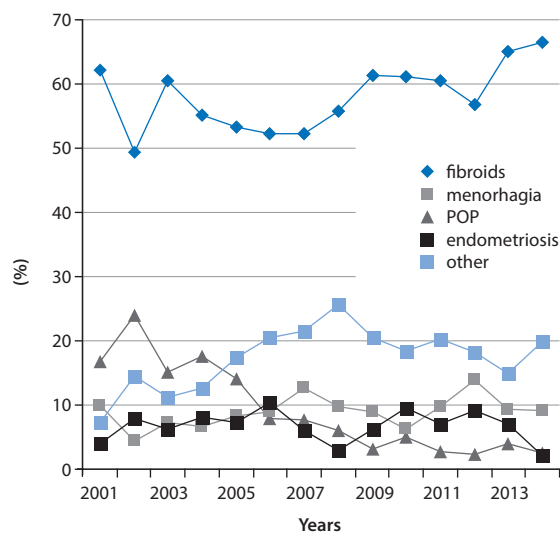
Between 2001 and 2015, the main approach to hysterectomy was the abdominal route, with preference for SAH, followed by TAH with bilateral salpingo-oophorectomy (2536 vs. 1760 cases; 45.05% vs. 31.27%, respectively). Since 2007, the number of TAH/BSO decreased by 49.8% and the number of SAH increased by 46.81%, as compared to the period between 2001 and 2006. During the study period, no important changes in the TVH rate have been reported. Since the beginning of 2011, a notable increase in the number of LASH has been observed.

According to NHS data on hysterectomies performed in Poland between 2009–2014, mean rates of TAH, TAH/BSO, TVH, SAH and LASH were 35.2%, 17.9%, 2.8%, 21% and 2.14%, respectively. During the same time interval, mean rates of TAH, TAH/BSO, TVH, SAH and LASH at the 2<sup>nd</sup> Department of Gynecology were 5.5%, 17.1%, 6.3%, 58.5 and 12.5%, respec-

**Table 1. Benign indications for hysterectomy between 2001 and 2015**

Year	Indications									
	Fibroids		AUB		POP		Endometriosis		Other	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
2001	171	62.1	27	9.8	46	16.8	11	4.0	20	7.3
2002	146	49.3	13	4.3	71	24.0	23	7.8	43	14.5
2003	168	60.4	20	7.2	42	15.1	17	6.1	31	11.2
2004	201	55.2	24	6.6	64	17.6	29	7.8	46	12.6
2005	156	53.2	24	8.2	41	14.0	21	7.2	51	17.4
2006	181	52.3	31	8.9	27	7.8	36	10.4	71	20.5
2007	216	52.2	52	12.6	32	7.7	25	6.0	89	21.5
2008	211	55.7	37	9.76	23	6.1	11	2.9	97	25.6
2009	289	61.4	42	8.9	15	3.2	29	6.2	96	20.4
2010	263	61.0	27	6.3	21	4.9	41	9.5	79	18.3
2011	301	60.4	48	9.6	13	2.6	35	7.0	101	20.3
2012	276	56.8	67	13.8	11	2.3	44	9.0	88	18.1
2013	267	65.0	38	9.3	16	3.9	29	7.1	61	14.8
2014	246	66.5	34	9.2	9	2.4	8	2.2	73	19.7
2015	221	69.7	38	12.0	13	4.1	6	1.9	39	12.3
Total number of procedures	3313	58.9	522	9.3	444	7.8	365	6.5	985	17.5

AUB — abnormal uterine bleeding; POP — pelvic organ prolapse



**Figure 2.** Annual differences between the main indications for hysterectomy. The presence of symptomatic fibroids, followed by abnormal uterine bleeding (AUB), pelvic organ prolapse (POP), endometriosis and other causes (adenomyosis, endometrial hyperplasia, benign ovarian cysts), constituted the most common indication for hysterectomy. The number of hysterectomies performed due to POP decreased since 2005, after the introduction of vaginal mesh procedures in our department

tively. Data comparison revealed a significant difference in the approach to hysterectomy (in favor of SAH and minimally invasive techniques) at our Department. Mean TAH/BSO rates were similar but the TAH rate was higher in the NHS database as compared to our registry (Figure 3).

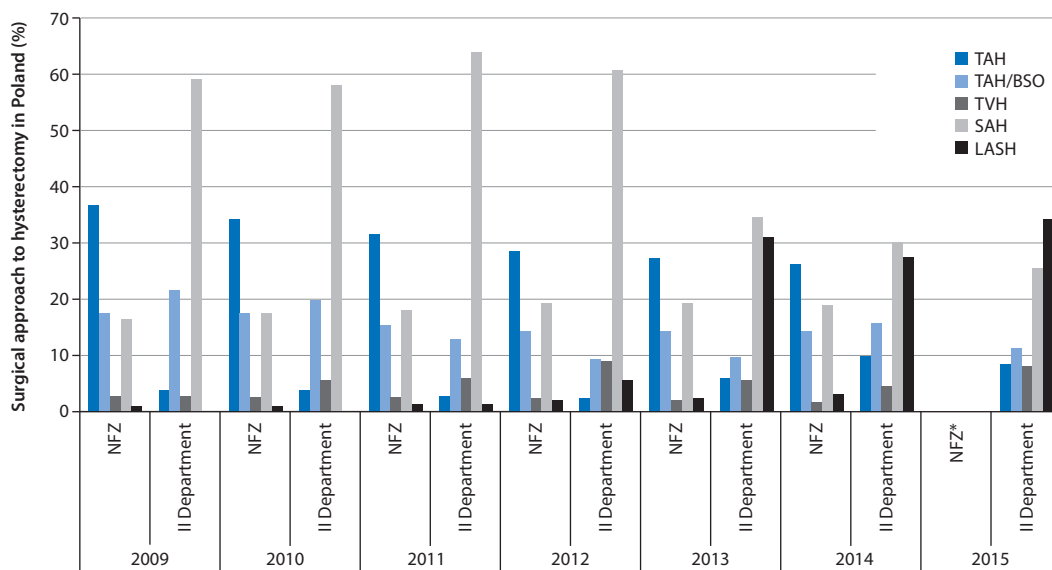
## DISCUSSION

Hysterectomy remains to be the most common procedure among gynecologic surgeries. The latest studies have suggested the preferred approach to be the laparoscopic or vaginal route, if possible. The evidence in favor of minimally-invasive hysterectomies is reflected in the current international guidelines and is associated with decreased perioperative morbidity [17, 18]. The introduction of laparoscopy into gynecological surgical practice has changed hysterectomy trends dramatically [18]. The proportion of hysterectomies performed laparoscopically in the USA has increased significantly during the last 20 years, from 0.3% in 1990 to 11.8% in 2003 [19]. Recently, FDA issued a statement concerning the safety of power morcellation in case of LASH, especially in terms of oncological risks [20]. The most recent analyses have clearly indicated that power morcellation is safe, provided indications for such procedures are followed [21, 22]. Regardless, the abdominal approach continues

**Table 2.** Number of various types of hysterectomy performed at the 2<sup>nd</sup> Department of Gynecology by year

Year	Type of surgery					
	TAH	TAH/BSO	TVH	SAH	LASH	Total no of procedures
2001	18	194	51	12	0	275
2002	17	228	44	7	0	296
2003	15	170	38	55	0	278
2004	32	169	61	102	0	364
2005	20	137	53	83	0	293
2006	36	170	20	120	0	346
2007	24	74	39	277	0	414
2008	12	122	56	189	0	379
2009	21	117	14	319	0	471
2010	19	99	27	286	0	431
2011	17	74	34	365	8	498
2012	13	53	51	338	31	486
2013	29	46	27	163	146	411
2014	41	66	19	127	117	370
2015	30	41	29	93	124	317
Total number	n	344	1760	563	2536	5629
	(%)	6.11	31.27	10.00	45.05	100

TAH — total abdominal hysterectomy; TAH/BSO — total abdominal hysterectomy with bilateral salpingo-oophorectomy; TVH — total vaginal hysterectomy; SAH — subtotal abdominal hysterectomy; LASH — laparoscopically-assisted subtotal hysterectomy



**Figure 3.** Comparison of national NHS database and internal trends for hysterectomy between 2009 and 2015 (no NHS data were available for the period between 2001–2008); NFZ — Narodowy Fundusz Zdrowia; TAH — total abdominal hysterectomy; TAH/BSO — total abdominal hysterectomy with bilateral salpingo-oophorectomy; TVH — total vaginal hysterectomy; SAH — subtotal abdominal hysterectomy; LASH — laparoscopically-assisted subtotal hysterectomy

to be the mostly common choice worldwide. To the best of our knowledge, our cross-sectional study has been the first to compare different types of hysterectomy in Poland both, locally and nationwide. The investigated trends in methods of uterine removal and the number of procedures have remained stable over the last 15 years of observation, but several significant changes in operative trends for hysterectomy have been noticed at the 2<sup>nd</sup> Department of Gynecology, Medical University of Lublin.

The analysis of SAH and LASH rates has clearly demonstrated a difference between NHS data and our Department. The number of SAH and LASH procedures in our department was almost 3- and 6-fold higher, respectively as compared to data from Poland. New international trends to abandon total radical hysterectomy in favor of more harmless procedures like laparoscopic-assisted hysterectomy or subtotal hysterectomy have been discussed in several gynecological congresses and publications. Due to lack of well-defined indications for subtotal hysterectomy, the final decision is made by the surgeon and based on patient condition and wishes. Total abdominal hysterectomy, unless necessary, can cause sexual dysfunction due to shortened vaginal cuff, increased morbidity, prolonged time of operation, higher blood loss, increased risk of pelvic organ prolapse, and complication in wound healing. In our opinion, this less- or minimally-invasive approach to hysterectomy should be first taken into account before applying more radical procedures. However, the benefits from minimally-invasive surgery are weighed against the reported increase in urologic injury during laparoscopic hysterectomy [8].

No cases of laparoscopic hysterectomies reported at the 2<sup>nd</sup> Department of Gynecology and very low numbers reported in Poland between 2001–2010 can be explained by the lack of necessary equipment in the operating room, financial and NHS refund issues, as well as lack of proper training. The recent increase in minimally-invasive hysterectomies may be reflected in cost-effectiveness i.e.: shorter recovery time, less blood loss, fewer infections, as well as more exposure to laparoscopy training. Furthermore, prophylactic salpingectomies for the prevention of ovarian cancer have been performed at our Department since 2010. The functional and anatomical outcome, quality of life and sexual function of patients who underwent hysterectomy for benign conditions has been published elsewhere [23, 24]. We are aware of the fact that several factors can be associated with different choice of hysterectomy type, including geographic location, race and ethnicity, hospital grade, operating room equipment, and training pattern, while NHS reports show only the average nationwide trend in Poland [18, 19]. This is the biggest cohort study evaluating the changing trends in operative gynecology conducted up-to-date in Poland. However, these studies have not examined factors which may influence the choice of hysterectomy type.

The ideal choice of the surgical approach to hysterectomy should be based on patient clinical presentation, experience and skill of the surgeon, evidence-based practice, and patient preferences. The surgery method should be as harmless as possible, while providing adequate treatment and optimal medical care. Although the benefits of

minimally-invasive surgery have been well-documented, all options of surgical approach should be readily available for appropriately selected patients. Further research is needed to better understand factors influencing hysterectomy trends in different gynecology centers.

## CONCLUSIONS

Less invasive techniques of hysterectomy (LASH, SAH), which are preferred at the 2<sup>nd</sup> Department of Gynecology in Lublin, are effective and safe options for treating benign conditions. We are of the opinion that these approaches should be offered to patients instead of more radical techniques. Proper training of physicians may influence the decision-making process in favor of minimally invasive techniques.

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