

Hysterectomy: benefits of clinical performance indicators in the evaluation of healthcare facilities

A. Mancuso, Assoc. Prof.; A. De Vivo, M.D.; O. Triolo, Assoc. Prof.; S. Irato, M.D.; G. Mazzù, M.D.

Department of Gynaecological, Obstetrical Sciences and Reproductive Medicine, University of Messina, Messina (Italy)

Summary

Purpose: The aim of our study was to verify, by applying clinical performance indicators, the quality of healthcare given to hysterectomy patients and the benefits on their adoption in healthcare facilities.

Methods: The different surgical approaches and indications for surgery were evaluated in 534 patients analysing postoperative short-term complications and triggered clinical performance indicators (CPIs).

Results: Surgery was performed by the abdominal (80.9%) and vaginal route (19.1%). Postoperative complication rate was 13.5% and CPIs were triggered 108 times overall: 42 in benign conditions (10.3%) and 30 in malignancy (23.4%) ($p = 0.001$). In patients operated on for benign conditions the different approaches, abdominal or vaginal, showed differences in postoperative period ($p = 0.4$). In 10.9% of malignant and in 2.9% of benign conditions hospital stay was triggered ($p = 0.001$). Vaginal surgery showed a shorter average stay than laparotomy ($p = 0.001$).

Conclusion: The use of CPIs may determine a refinement of clinical performance with positive effects on health, patient satisfaction, postoperative morbidity hospitalisation and healthcare cost savings.

Key words: Hysterectomy; Clinical performance indicators; Postoperative complications; Healthcare expenditure.

Introduction

In recent years the quality of healthcare and the expenditure for health services have been considered with increasing attention that has entailed a growing awareness of the level of performance of health service facilities [1]. The assessment of healthcare performance is however not so simple as the factors involved are multifarious. In the sphere of surgery, such an analysis is probably less problematic because the elements that are useful to verify the performance and costs, and subsequently to make any necessary amendments, are obtainable by examining intra- and postoperative complications [2].

In the field of gynaecology, hysterectomy is the most frequently performed surgical operation as it represents the definitive treatment for many diseases [3]. This type of surgery may give rise to serious problems linked to medical and psychological complications that affect the patient's quality of life and significantly increase expenditures for healthcare. Reduced surgical morbidity leads not only to greater satisfaction on the part of the patient, but also to shortened hospital stay and lower healthcare costs.

In order to assess the quality of healthcare service, a number of clinical performance indicators (CPIs) have been proposed that take into account a variety of factors linked to surgery, postoperative outcome and hospital stay [4].

Advances in surgery and anaesthesiology have progressively reduced the number and severity of complications, most of all those arising in the short and medium

term. As a consequence of this, the degree to which hysterectomy is accepted by women has increased and often encourages the gynaecologist to be less wary of resorting to it. There are, however, a number of issues open to debate, namely the different routes (laparotomy or vaginal), the most suitable surgical technique to adopt, and recourse to conservative surgical operations, with regard to the specific pathologies concerned [5].

The aim of our study was to verify the quality of healthcare offered by our Department to hysterectomy patients by applying the CPIs suggested by the most recent literature.

Materials and Methods

The study was carried out by means of a retrospective review of 534 patients who consecutively underwent hysterectomy in our Department in the years 2000 and 2002.

Prior to the operation each patient was subjected to a clinical and anaesthesiological assessment. In each case the same pre-operative protocol was adopted and all patients were given prophylactic antibiotics with amoxycillin and clavulanic acid (1.2 g IV), at least 30 minutes before the surgical incision. Clarythromycin (500 mg IV) was given to patients allergic to penicillin.

All the operations, having obtained the patients' consent, were carried out by the same permanent medical staff and, depending on the type of surgery, all cases were treated according to the same postoperative protocol with regard to endovenous infusions, catheter removal, early mobilisation, medication of the wound and thromboembolic prophylaxis. The latter treatment was tailored case by case on the basis of thromboembolic risk and was achieved by using low molecular weight heparin that was started 24 hours after the operation. The indicators used in the postoperative course to assess the healthcare performance are shown in Table 1.

Table 1. — *Clinical performance indicators.*

Temperature > 38°C*
Wound complications
Deep Venous Thrombosis
Blood transfusion
Return to theatre
Hospital Stay > 10 days

* Excluding first 24 hours.

A bacterial load of more than 100,000 units in urine samples was considered a sign of infection of the urinary tract and the surgical wound; likewise a positive result for a tampon of secretions taken from the wound. In these cases the administration of antibiotic treatment was guided by the antibiogram.

All patients with an uncomplicated postoperative course were discharged in four to seven days depending on the type of surgery. Permanent medical staff assessed the discharge of patients considering their general and local clinical condition.

Statistical analysis of results was performed using the chi square test and Student's t-test considering a value of $p < 0.05$ to be significant.

Results

Patient age ranged from 38 to 82 years (average 55.6 ± 10.9); 216 were still of fertile age (40.4%) and 318 were in menopause (59.6%). Two hundred and thirty-six (44.2%) were overweight (BMI ≥ 25), 160 (29.9%) had a heightened thromboembolic risk based on the Rock and Thompson classification [6] and 50 patients (9.4%) presented cardiovascular disease and/or metabolic dysfunctions, with a slightly increased anaesthesiological risk.

The operation was performed by the abdominal and vaginal route in 432 cases (80.9%) and 102 cases (19.1%), respectively. In 256 cases indications for surgery were dictated by malignancy (24%), and by benign pathology in the remaining 406 (76%). In the patients operated on for neoplasia, 82 were affected by endometrial carcinoma (15.4%), 24 by ovarian neoplasia (4.5%) and 22 by cervical carcinoma (4.1%).

The benign conditions included uterine fibromatosis in 242 cases (45.3%), uterine bleeding resistant to medical treatment in 44 (8.2%), genital prolapse in 102 (19.1%) and endometriosis and/or another form of benign pathology in 18 (3.4%) (Table 2).

Seventy-two patients had postoperative complications (13.5%) and CPIs were triggered 108 times overall. A single indicator was triggered in 44 cases (8.2%), two indicators in 22 cases (4.1%) and three or more CPIs in six patients (1.5%). The most common complication was high temperature affecting 32 patients (6%), followed by complications due to the surgical wound, which occurred in 20 patients (3.7%). Blood transfusion was required in 16 cases (3%), while less common were problems of urinary voiding dysfunction affecting six patients (1.1%). Episodes of deep venous thrombosis of the lower limbs and haemorrhagic complications inducing a return to operating room occurred both in four patients (0.7%) (Table 3). There were no cases of accidental lesions of the pelvic viscera or of pulmonary emboli or mortality.

Table 2. — *Characteristics of the sample.*

No.	534
Age (mean \pm SD)	55.6 ± 10.9
<i>Hormonal Status</i>	
Fertile	216 (40.4%)
Menopausal	318 (59.6%)
<i>Risk Factors</i>	
BMI ≥ 25	236 (44.2%)
Thromboembolism	160 (29.9%)
Cardiovascular or dysmetabolic co-morbidity	50 (9.4%)

Surgical Indications	
<i>Malignant Diseases</i>	128 (24%)
Endometrial	82 (15.4%)
Ovarian	24 (4.5%)
Cervical	22 (4.1%)
<i>Benign Diseases</i>	406 (76%)
Uterine Fibromatosis	242 (45.3%)
Metrorrhagia	44 (8.2%)
Genital Prolapse	102 (19.1%)
Endometriosis-miscellaneous	18 (3.4%)

Surgical Approach	
Abdominal	432 (80.9%)
Vaginal	102 (19.1%)

BMI = body mass index.

Table 3. — *Rates of complications.*

Complications	No.
Temperature	32 (6%)
Wound complications	20 (3.7%)
Blood transfusion	16 (3%)
Urinary voiding dysfunction	6 (1.1%)
Deep venous thrombosis	4 (0.7%)
Return to operating room	4 (0.7%)

In the 406 patients that underwent hysterectomy for benign causes, complications were recorded in 42 cases (10.3%), 26 of which were single and 16 multiple, with a total of 64 CPIs triggered (59.2%). In the 128 patients treated for malignant pathology, there were 30 (23.4%) cases with complications; in 18 cases single and in 12 multiple with 44 indicators triggered in all (40.7%). The difference between the two groups was statistically significant ($p = 0.001$).

Considering the sample studied as a whole, the patients treated by laparotomy had postoperative complications in 64 cases (14.8%) with 100 CPIs triggered (92.6%), while in the patients operated on vaginally, complications arose in eight cases (7.8%), all with a single indicator (8/108 CPIs, 7.4%). The difference was not statistically significant ($p = 0.09$) (Table 4).

As regards laparotomy alone, cases with postoperative complications amounted to 34 (11.2%) in patients operated on for benign conditions and 30 (23.4%) in those treated for malignant pathology ($p = 0.001$), with 56 CPIs triggered in the former group (51.8%) and 44 in the latter (40.7%).

In the case of subjects operated on for benign conditions the different approaches, abdominal or vaginal, gave rise to differences in the postoperative period. Out of the 304 patients treated by laparotomy, postoperative complications were recorded in 34 cases (11.2%), while

Table 4. — *Surgical indications and CPIs triggered.*

	No.	Single CPIs triggered	Multiple CPIs triggered	Total CPIs triggered	p
<i>Indications</i>	72	44	28	108	
Benign diseases	42 (10.3%)	26	16	64	0.001
Malignant diseases	30 (23.4%)	18	12	44	
<i>Abdominal approach</i>	64	36	28	100	
Benign diseases	34 (11.2%)	18	16	56	0.001
Malignant diseases	30 (23.4%)	18	12	44	
<i>Benign diseases (surgical route)</i>					
Abdominal	34 (11.2%)	18	16	56	0.4
Vaginal	8 (7.8%)	8	0	8	
<i>Surgical route (all cases)</i>					
Abdominal	64 (14.8%)	36	28	100	0.09
Vaginal	8 (7.8%)	8	0	8	

only eight cases with complications were found (7.8%) in the remaining 102 patients operated on vaginally. The difference between the two samples was not statistically significant ($p = 0.4$). Furthermore, in the group operated on vaginally the eight CPIs were single against the 18 single and 16 multiple triggers recorded in the laparotomy group.

The cases in which three or more indicators of complications were triggered occurred in only six patients (1.1%).

The arising of postoperative complications triggered the indicator relating to hospital stay in 26 patients (4.9%). In 14 (10.9%) and 12 cases (2.9%) the hysterectomy was carried out for malignant and benign conditions, respectively ($p = 0.001$).

The average stay was 7.6 ± 2.3 days for the sample as a whole: 7 ± 1.1 days in cases with an uncomplicated postoperative course and 10.9 ± 4.6 days in the 72 cases in which complications were recorded ($p = 0.001$).

The operations performed via the vagina showed a shorter average stay of 6.2 ± 0.9 days than the laparotomy cases (7.5 ± 1.5 days) ($p = 0.001$) and in no case did the stay in hospital exceed ten days; the 26 cases, in which the indicator regarding stay was triggered, were related to patients who had undergone surgery via the abdomen ($p = 0.02$) (Table 5).

Table 5. — *CPIs: "Hospital Stay".*

	Cases (n)	Days*	p**
Whole sample	534	7.6 ± 2.3	
<i>Postoperative course</i>			
With complications	72	10.9 ± 4.6	0.001
Without complications	462	7.0 ± 1.1	
<i>Surgical approach</i>			
Vaginal	102	6.2 ± 0.9	0.001
Abdominal	432	7.5 ± 1.5	

* mean \pm standard deviation; ** Student's t-test.

In financial terms, considering that the cost of one day in hospital for our facility amounted to \$546, a single case with uncomplicated postoperative course cost \$3,822, while one with postsurgical complications came to \$5,951 with an increase of 55.7%. For the patients whose stay in hospital exceeded ten days, the average expenditure was \$8,463, thus a higher outlay of 121.5% (Table 6).

Table 6. — *Hospital stay expenditure.*

	Expenditure*	Outlay
Cases without complications	\$3,822	
Cases with complications	\$5,951	55.7%
Length > 10 days	\$8,463	121.5%

* cost of a single day x hospital stay average.

Discussion

In our sample the percentage of postsurgical short-term complications amounted to 13.5%. This percentage, which is lower than the ones reported some years ago by Clarke *et al.* (27.5%) [7], is in line with the rates reported in the recent literature between 9% and 17.4% [4, 5]. However, a precise comparison in this type of study is not always possible as the samples are not homogeneous.

In more than half of the patients with postoperative complications (55.5%) single CPIs were triggered. In general these were attributable to slight infections affecting the urinary tract or the surgical wound, but did not influence the clinical outcome as patients responded promptly to the treatment. In 18 cases (25%) single CPIs triggered did have an effect on the duration of stay, prolonging the time spent in hospital. In these cases more severe complications were involved, mainly antibiotic-resistant infections or vascular problems. When these cases are added to ones with multiple complications the result is that the hospital stay lasted more than ten days in about a third of cases with complications (36.1%). In spite of this, the percentage of patients whose time in hospital exceeded this period was low (4.9%) in the overall sample. The patients staying the longest were those with serious complications (deep venous thrombosis, haemorrhage requiring transfusion, infections resistant to antibiotic treatment) or in cases in which a number of complications arose with multiple triggering of CPIs (1.1%). The adoption of personalized antibiotic and thromboembolic prophylaxis measures and the insertion of minor expedients into pre- and postoperative protocols might contribute to a reduction of infective and vascular morbidity, with favourable repercussions on duration of stay and healthcare costs [8]. The overall results, however, are evidence that the quality of care provided by our facility can be considered satisfactory and that today hysterectomy can be regarded as a safe operation, which is reassuring for women in need of this type of surgery.

Not surprisingly, the operations performed for malignant causes showed a higher rate of complications than those for benign causes. It is likely that this is linked to oncological surgery being radical and of longer duration, as these are factors that tend to heighten the risk of surgical complications. However, a point that should not be overlooked is that technical difficulties may arise even in operations performed for benign causes leading to intra- and postoperative complications. Indeed, it is known that myomas of conspicuous size, severe adhesions secondary to endometriosis, such as the outcome of pelvic inflammatory disease or previous surgery may alter pelvic anatomy making the operation longer and more difficult with increased risk of complications.

As regards the surgical method in patients with benign conditions, the vaginal approach showed a lower rate of postoperative complications and CPIs triggered, although the difference compared to the abdominal route was not significant ($p = 0.4$).

In gynaecology, the choice of surgical approach is still now a matter of debate: despite the fact that in many cases laparotomy is shown to be affected by a higher rate of complications [9], has a greater impact on the quality of life [10], lengthens the time spent in hospital [1] and is therefore more costly [12], it is still preferred over vaginal surgery. The data emerging from our study highlights that the vaginal route may represent a valid alternative and if patients are selected having carefully assessed the contraindications or using laparoscopy, as suggested by Kovac [13], better results might be achieved both in terms of clinical outcome and healthcare expenditure. In this respect, since the number of days in hospital is the factor with the greatest impact on healthcare expenditure, a reduction in the period of hospitalisation should surely permit cost savings to be obtained. In order to achieve this, first the frequency of complications must be altered: reducing their rate, even by only two percentage points (an easily achievable target), would have produced in our sample a savings of about \$28,600. Another contribution could be to promote vaginal surgery which, as our study shows, is affected by less serious complications and results in a shorter hospital stay. Here, a 10% increase in the number of operations performed using this approach (from 19.1% to 29.1%) in our sample, would have produced a savings of \$46,800. In a sample analogous to ours, one-day reduction in hospital stay on average (6.6 days instead of 7.6) – although the desired target should be aimed at a far greater reduction – would be in the order of \$291,200 in healthcare cost savings. In our case, the sum total of these expedients would amount to a reduction in healthcare expenditure of about \$366,600, an amount that is certainly not negligible considering that a similar exercise could be extended to other gynaecological and obstetric procedures in our field.

A final point concerns clinical performance indicators. Given that in the last few years certain specific types of surgery, such as heart and general surgery [1, 14], have already used them for a more precise assessment of treatment outcome, it would be useful to extend their application to our field. In order to achieve this, it would be important to single out objective indicators of clinical performance devised by the international scientific communities; these indicators would make it possible to compare data coming from different socio- and healthcare settings. The aim of all this would be to achieve the continuous refinement of treatment protocols in order to

improve clinical performance with positive effects on health and the level of patient satisfaction. Moreover, the inclusion of parameters such as length of hospital stay among the performance indicators would be useful to the healthcare organisation so as to rationalise expenditure and obtain financial benefits.

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Address reprint requests to:
A. MANCUSO, M.D.
Via Duca degli Abruzzi Isol., 520 D
98121 Messina (Italy)