



Contents lists available at ScienceDirect

## Taiwanese Journal of Obstetrics &amp; Gynecology

journal homepage: [www.tjog-online.com](http://www.tjog-online.com)

## Original Article

## Fast-track protocol for perioperative care in gynecological surgery: Cross-sectional study



Maria Gabriela B. Kuster Uyeda<sup>\*</sup>, Manoel João Batista Castello Girão,  
Ébe dos Santos Monteiro Carbone, Marcelo Cunio Machado Fonseca,  
Mayara Ronzini Takaki, Marair Gracio Ferreira Sartori

Department of Gynecology and Obstetrics, Universidade Federal de São Paulo, Escola Paulista de Medicina (Unifesp-EPM), Brazil

## ARTICLE INFO

## Article history:

Accepted 25 February 2019

## Keywords:

Care protocol  
Fast-track surgery  
Fasting  
Perioperative care  
Gynecological surgical procedures

## ABSTRACT

**Objective:** To compare clinical and surgical outcomes in patients admitted to a gynecological surgery ward before and after the implementation of an evidence-based multimodal and multiprofessional care protocol by the hospital staff.

**Material and methods:** In this historically-controlled cross-sectional study, we compared clinical and surgical outcomes among all women admitted to the gynecological ward of a university public hospital for elective surgery for various reasons before and after the implementation of a multimodal care protocol. The protocol had been implemented to adjust the following procedures to evidence-based recommendations: fluid management/hydration, antimicrobial prophylaxis, management of nausea and vomiting, antithrombotic prophylactic therapy, preoperative fasting, mechanical bowel preparation (reduction), pain management, use of urinary catheters, and stimulus to ambulation.

**Results:** After the protocol implementation, fasting time was reduced in approximately 10 h. Patients had to undergo bowel preparation significantly less frequently, and the volume of fluids was reduced too. The use of nausea and vomit prophylaxis increased almost 20 times, but only nausea episodes were reduced. The frequency of antithrombotic prophylactic therapy more than doubled. Hospitalization time decreased significantly.

**Conclusions:** In this study, we observed significant improvements in clinical outcomes after the implementation of a multimodal protocol for perioperative care in the gynecological ward of a public university hospital in Brazil. The protocol implementation was associated with reductions in fasting time, bowel preparation, administration of fluids, pain, nausea and hospitalization time, allowing the treatment of more patients per year in the same ward.

© 2019 Taiwan Association of Obstetrics & Gynecology. Publishing services by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

The reorganization of perioperative care can reduce morbidity in patients admitted for non-cardiac surgery, eventually reducing hospital stay [1–3]. This optimization, known as “fast-track” strategy, aims to reduce the physiological burden of surgery and to accelerate recovery [4,3] by replacing routines without scientific

background by others that are evidence-based [5], with the participation of all care providers involved (surgeons, nurses, anesthesiologists, nurses and physical therapists) [3].

Guidelines (described in the ERAS (Enhanced Recovery After Surgery) study) have been published for postoperative [6] and perioperative care [7], including prophylaxis of thromboembolism, fluid therapy, nutritional care, prevention of ileus, glucose control, analgesia, peritoneal and urinary drainage, early mobilization [6], as well as counseling and education, preoperative medical care, bowel preparation, fasting, laxative use, postoperative diet, catheter removal [7]. These guidelines were based on studies in gynecologic/oncology surgery and in rectal/pelvic surgery [6,7].

The ACERTO (Aceleração da recuperação total pós-operatória) study investigated the use of the ERAS guideline adapted to the reality of a university hospital in Brazil regarding hospitalization

<sup>\*</sup> Corresponding author. Universidade Federal de São Paulo – Escola Paulista de Medicina (Unifesp-EPM), Rua Napoleão de Barros, 715, 7º andar, Vila Clementino, São Paulo (SP), CEP 04024-002, Brazil.

E-mail addresses: [gabrielakuster@gmail.com](mailto:gabrielakuster@gmail.com) (M.G.B. Kuster Uyeda), [girao@unifesp.br](mailto:girao@unifesp.br) (M.J. Batista Castello Girão), [ebemonteiro@gmail.com](mailto:ebemonteiro@gmail.com) (É.S.M. Carbone), [mcmf64@globo.com](mailto:mcmf64@globo.com) (M.C. Machado Fonseca), [yayaron@yahoo.com.br](mailto:yayaron@yahoo.com.br) (M.R. Takaki), [marair.sartori@uol.com.br](mailto:marair.sartori@uol.com.br) (M.G. Ferreira Sartori).

time, infection, complications and deaths among general surgery patients, and compared the outcomes before and after the implementation of the new protocol. The multimodal protocol resulted in a significant decrease in morbidity and hospital stay [5,8]. However, there are no studies of a multimodal approach in a gynecologic hospital ward, including all gynecologic subspecialties.

The aim of this study was to compare clinical and surgical outcomes in patients admitted to a gynecological surgery ward before and after the implementation of an evidence-based multimodal and multiprofessional care protocol by the hospital staff.

## Materials and methods

### *Design, setting and ethics*

This is a historically-controlled cross-sectional study, involving the women admitted to the gynecological ward of a university public hospital for emergency or elective surgery for various reasons. The study compared the clinical and surgical outcomes of patients before with those of another group of patients admitted after the implementation of a multimodal care protocol. The institutional review board approved the study project (protocol number 751.406). Informed consent was waived for this observational study, since the care protocol was implemented by the hospital, and patients signed informed consents for each procedure individually and the study did not pose any additional risk or discomfort for patients. Anonymity was guaranteed.

### *Participants*

We recruited all consecutive patients admitted for gynecological surgical procedures between July 2014 and October 2015 for this study, in three different phases: in the first phase, we reviewed the medical records of the first group of patients, admitted from July to September 2014, and made interviews when necessary, for the identification of problems with potential to extend hospitalization or cause complications or harms. The second group of patients underwent the implementation of the project, during October 2014 and April 2015. The third phase comprised patients undergoing surgery from May 2015 to October 2015, according to the new multimodal protocol that was implemented. In this study, we compared participants from Phases 1 and 3.

We included in the study women admitted for gynecological treatments (elective surgery). We excluded patients if they received treatments in other wards of the hospital (such as the Urology clinic, the Plastic Surgery or others), because these did not follow the same protocol of care (described below). For the same reason, we excluded patients admitted by the emergency room of the hospital, and who were not under the Gynecology Ward care exclusively. We also excluded patients who were admitted for clinical treatments, whose surgery was cancelled for any reason or patients who did not receive the whole protocol of postoperative care due to the lack of materials.

### *Protocol of care*

The protocol of care that was implemented in the hospital had been named “ORIGAMI” (an acronym for the expression, in Portuguese, for “optimizing recovery during hospital admission of women for gynecological treatment in an integral way perspective”). The ORIGAMI project has modified the following procedures in the Gynecological Ward of the hospital:

- management of nausea and vomiting (adjustment).
- antithrombotic prophylactic therapy (adjustment).
- preoperative fasting (reduction).
- mechanical bowel preparation (reduction).
- pain management (reduction of episodes).
- use of urinary catheters (reduction);
- ambulation (stimulus).

Details of these modifications are presented in [Table 1](#) [9].

### *Variables and data sources*

The main variables addressed in this study, in the comparison of the periods before and after the implementation of the project (Phases 1 and 3) were: hospitalization time, number and type of perioperative complications. During Phase 1, one researcher (MGK) examined all medical records of patients admitted to the gynecologic ward in the period before the ORIGAMI project implementation. The same researcher examined all medical records of patients admitted during the third Phase of the study. In both situations, the examination of medical records was made taking care of confidentiality, and data were collected without the knowledge of the staff (physicians, nurses or other health professionals caring for the patients) about the research objectives and development.

The variables we analyzed were anthropometric and clinical baseline data, such as age, smoking status, body mass index, contraceptive use or hormonal therapy, comorbidities, and surgical data, including the indication, the type of surgery and access, surgical time and time under anesthesia. Before and after surgery, we investigated these variables: time of fasting, colon preparation, fluids administration, admittance in the intensive care unit (ICU), antibiotic use, pain prophylaxis or management, nausea and vomit management, antithrombotic prophylaxis, bladder catheter use and complications. We registered hospitalization time as well.

Surgeries were classified as large, medium or small according to the type or complexity. Small-sized surgeries were Bartholin or Skene gland incision, drainage or exeresis, excision of polyp, hymenotomy, endoscopic treatment of urinary incontinence, gynecological curettage, surgical correction of hypertrophy of small lips, reconstruction of the breast areolar plate, unilateral resection of the main ducts of the breast, one-sided double-J stent endoscopic placement, release of pelvic adhesions with or without resection of peritoneal cysts or salpingolysis, trachelectomy (amputation, conization), excision of vaginal cyst.

Medium-sized surgery could be minimally-invasive procedures or minor procedures using abdominal incisions. Laparoscopic treatments were gynecologic procedures (with or without biopsy), release of pelvic adhesions, drainage of abscess, tubal ligation, oophorectomy and hysteroscopy (for myomectomy, polypectomy, metroplasty, endometrectomy), unilateral percutaneous nephrostomy, peritoneal endometriosis treatment. Non-laparoscopic procedures were tubal ligation, colpoplasty, omentectomy, oophorectomy, salpingectomy, treatments of urinary incontinence (with or without vaginal or abdominal sling or prostheses), colpolectomy (Lefort surgery), vaginal prolapse correction, colectomy, treatment of peritoneal endometriosis, myoma embolization or uterine myomectomy, Fallopian tube repair, salpingectomy, gynecological fistula treatment, hysterectomy (total or subtotal), vesicovaginal fistula, enterocoele correction. Some breast medium-sized surgeries were performed in the same ward: breast segmentary quadrantectomy, gynecomasty, mastoplasty, sentinel lymph node resection, axillary lymphadenectomy, breast asymmetry correction, simple mastectomy, correction of mammary hypertrophy, breast reconstruction with prosthesis and/or expander, or with regional skin patches. Additionally, some medium-sized

- fluid management/hydration (adjustment).
- antimicrobial prophylaxis (adjustment).

**Table 1**

The “ORIGAMI” protocol implemented in the gynecological ward of a university public hospital.

Area	Practice before	Intervention	Protocol after modifications
Fluid management/hydration	Indiscriminate use in preoperative and postoperative periods	Adjustment	Maximum of intravenous 5 ml/kg/hour during anesthetic procedure and zero balance (1.75 l/day to 2.75 l/day) or negative balance (below 1.75 l/day) during the postoperative period
Antimicrobial prophylaxis	The preoperative use of antibiotics was not compliant with the recommendations of the hospital's infection control committee. Used postoperatively even without proper indication, and without control for timing and type of antibiotics.	Adjustment	Antibiotics administered one hour before surgery only when specifically recommended by the hospital's infection control committee and with the type of drug recommended by the committee.
Management of nausea and vomiting	Prescription varied according to the attending or resident physician, and it was not evidence-based	Adjustment	Prophylactic dimenhydrinate or ondansetron for patients with one of the risk factors: history of previous nausea and vomiting after surgery, less than 50 years of age, nonsmoker.
Antithrombotic prophylactic therapy	Performed only for some oncological patients	Adjustment	Using the Caprini Risk Assessment score [9]
Preoperative fasting	Initiated at midnight, independent of the time of surgery	Reduction	Limitation to 8 h for solids <sup>a</sup> . An hypercaloric supplement was offered up to 4 h before the onset of anesthesia, with no residues. Caloric content was 1.5 kcal/ml (package of 200 ml), with 11% of calories from proteins (whey protein), 89% from carbohydrates (maltodextrin and sucrose) and 0% from lipids. This supplement was free of fibers, lactose and gluten.
Mechanical bowel preparation	Indiscriminate use of mannitol and enemas	Reduction	“Light” preparation, without mannitol, using a laxative (bisacodyl) and enema; or a “heavier” scheme, with the “light” preparation in the first day and mannitol 20% (250 ml diluted in 250 ml of orange juice) in the second day until stools were clarified, only in cases of colon surgery for endometriosis lesions and metastases treatments
Pain management	Inadequate use of pain medication. No protocol for the surgeries, some patients received no medication.	Reduction	Attending could choose: Analgesics or NSAIDs in small surgeries such as hysteroscopic or radiointervention. Analgesics combined with NSAIDs should be used in medium surgeries, such as breast, vaginal, endovascular and laparoscopic procedures. And analgesics combined with NSAIDs and opioids were reserved for major abdominal surgeries. All medication was also adjusted according to the pain reported by the patient using a visual analogue scale.
Use of urinary catheters	Removed 24 h after surgery	Reduction	Removal of bladder catheter 24 h after surgery at most; preferably up to 18 h after surgery. restrictions to the use of nasogastric tube or drains, except when specifically indicated
Ambulation	Not stimulated	Stimulus	The patient should walk in the 6 h after surgery, and should stand or stay in the sitting position for 2 h in the day of surgery

<sup>a</sup> Except for patients with history of gastroesophageal reflux, morbid obesity, and pyloric stenosis syndrome. NSAIDs = non-steroidal anti-inflammatory.

procedures in the ward addressed problems related to gynecological or breast cancer or metastases, such as colostomy or enterostomy (for cancer or endometriosis treatment), omentectomy, pelvic abdominal wall tumor resection, appendectomy, segmental enterectomy, closure of colostomy or enterostomy, quadrantectomy and axillar lymphadenectomy.

Some breast procedures were considered as large-sized, such as radical or modified radical mastectomy, mammary reconstruction with muscle or myocutaneous flap or even subcutaneous mastectomy with prosthesis insertion. Other large surgeries were typically total hysterectomy, pelvic lymphadenectomy, neovagina, vulvectomy, ovarian cancer (debulking) or abdominal recto-sigmoidectomy. Some of these large-sized surgeries could also be performed by laparoscopy.

### Statistical analysis

We compared averages of continuous variables between the two phases using the Student t test or the non-parametric Mann-Whitney test, when data was not distributed normally. We compared categorical variables using the chi-square test. We used the statistical software R 3.3.1 (R Core Team, 2015) for statistical analysis. The tests considered a level of significance of 5%.

### Results

During the first phase of the study, 233 patients were admitted to the gynecological ward of the hospital. A total of 365 patients

were admitted during the second phase, when the protocol of care was being changed, and another 412 entered the hospital to have surgery after full implementation of the ORIGAMI project. From the patients admitted in Phase 1, 36 had to be excluded, and from Phase 3, 222 patients, for the reasons shown in Fig. 1.

Patients from Phase 1 were similar to those from Phase 3 regarding age, race, smoking habit, use of hormones and BMI (body mass index) (Table 2). Among patients from Phase 1, 31.5% had comorbidities (most hypertension), and 26.3% of those in Phase 3. Table 2 also shows that the groups were also similar regarding surgery size, access, time under anesthesia and total surgery time.

Patients in Phase 3, after the protocol implementation, underwent significantly shorter preoperative and total fasting time, with a reduction of approximately 10 h, and had to undergo bowel preparation significantly less frequently (Table 2). The administration of fluids also decreased from 2.7 L in Phase 1–2.1 L in Phase 3, with the restrictive balance predominating in Phase 3 (Table 3).

Antibiotics should be administered one hour before surgery. The time of antibiotic administration was adequate in Phase 1 ( $1.01 \pm 3.8$  h) and was also adequate in Phase 3 ( $0.49 \pm 0.45$  h;  $p = 0.175$ ). The use of urinary catheters was also similar: it was adequate both in Phases 1 and 3 (20.1 h versus 19.0 h respectively;  $p = 0.971$ ).

Table 4 shows that the proportion of patients receiving pain prophylaxis adequate for the surgery size increased significantly from Phase 1 to Phase 3. This reduced significantly the number of episodes of pain in the postoperative period.

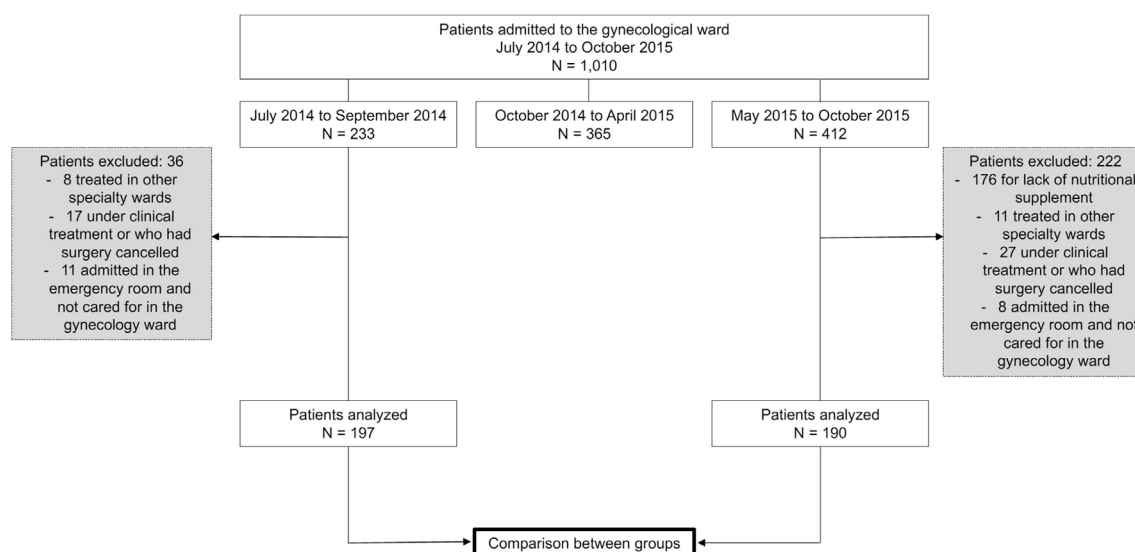


Fig. 1. Flow diagram of patients' inclusions and exclusions.

The use of nausea and vomit prophylaxis increased almost 20 times from Phase 1 to Phase 3, as shown in Table 4. However, only in the immediate postoperative period the number of episodes of nausea decreased significantly.

The use of antithrombotic prophylactic therapy more than doubled from Phase 1 to Phase 3: 44.9% of women in the first and 92% of them in the third phase received physical therapy, mechanical procedures or antithrombotic drugs. There was only one thromboembolic event in Phase 1 and none in Phase 3.

Hospitalization time decreased significantly from Phase 1 to Phase 3, as shown in Table 5. The number of patients with hospitalization time over 72 h also decreased significantly. Among these “long-staying patients”, the hospitalization time reduced 5.5 h (it was 76.8 h in Phase 1 and 71.3 h in Phase 3).

Table 2  
Characteristics of groups.

	Phase 1 (n = 197)	Phase 3 (n = 190)	p
Age (mean ± SD)	51.07 ± 14.35	49.6 ± 14.65	0.319
White race	61.46%	64.32%	0.242
Smokers	11.68%	12.63%	0.895
Body mass index (mean ± SD)	27.94 ± 5.44	27.52 ± 4.57	0.938
Surgery size			
Major	23.47%	19.47%	0.458
Medium	67.35%	73.16%	
Small	9.18%	7.37%	
Access			
Mammary	30.46%	32.11%	0.734
Hysteroscopic or endovascular	20.3%	20.53%	
Vaginal	17.26%	17.37%	
Abdominal	17.26%	12.63%	
Laparoscopic	14.72%	16.84%	
Radiosurgery	0%	0.53%	
Time under anesthesia (hours ± SD)	2.78 h ± 1.6 h	2.77 h ± 1.71 h	0.819
Total surgery time (hours ± SD)	2.03 h ± 1.44 h	2 h ± 1.38 h	0.919
Preoperative fasting time (mean ± SD)	17.73 h ± 9.13 h	9.05 h ± 4.98 h	<b>&lt;0.001</b>
Postoperative fasting time (mean ± SD)	9.51 h ± 8.31 h	8.67 h ± 5.32 h	0.826
Total fasting time (mean ± SD)	29.8 h ± 13.16 h	19.9 h ± 7.37 h	<b>&lt;0.001</b>
Absence of bowel preparation	89.34%	97.89%	<b>0.002</b>

SD = standard deviation.

Bold represents the significant values.

The number of postoperative complications during hospitalization was similar between phases (2% in Phase 1 and 0.5% in Phase 3, with  $p = 0.39$ ).

## Discussion

In this study, we observed significant benefits from the implementation of a multimodal protocol for perioperative care in the gynecological ward of a public university hospital in Brazil. The project resulted in reduction of fasting time, bowel preparation, administration of fluids, with a reduction in pain, nausea and hospitalization time. As the patients were similar in the two phases regarding clinical characteristics and complexity of surgical procedures, it is likely that the significant differences were associated with the modification in care that was undertaken. However, causal relationships should be further investigated in studies with a randomized clinical design.

The reduction in the hospitalization time has led to a striking impact in our public hospital dynamics: with a 17-hour reduction in the time that the woman spends in hospital, it is possible to perform one further surgical procedure in 3.53 days, resulting in 7 more patients operated on per month and 84 more patients per year, in only one of the beds of the gynecology ward. Considering the 12 beds in the ward it would be possible to operate around 1,000 more women in a year, with the same existing structure. This indicates that the ORIGAMI project should be prospectively evaluated in a clinical trial.

One of the changes proposed by the ORIGAMI project was the introduction of a food supplement four hours before the surgical

Table 3  
Characteristics of groups regarding fluid administration.

Use of fluids	Phase 1 (n = 197)	Phase 3 (n = 190)	p
Postoperative			<b>0.004</b>
Restrictive	90.36%	97.37%	
Zero balance	8.12%	1.05%	
Liberal	1.52%	1.58%	
Intraoperative			0.248
mL/Kg/h	15.85	16.62	
Total			<b>0.021</b>
Restrictive	49.24%	52.38%	
Zero balance	23.35%	31.22%	
Liberal	27.41%	16.4%	

Bold represents the significant values.



**Table 4**  
Characteristics of groups regarding pain and nausea and vomiting management.

Variables	Phase 1 (n = 197)	Phase 3 (n = 190)	p
Patients receiving pain prophylaxis adequate for surgery size	50%	71.05%	<b>&lt;0.001</b>
Pain prophylaxis (access)	60.41%	78.95%	<b>&lt;0.001</b>
At least 1 pain episode in the IPP	38.01%	15.26%	<b>&lt;0.001</b>
At least 1 pain episode postoperatively	34.27%	16.67%	<b>&lt;0.001</b>
Nausea and vomiting prophylaxis	4.57%	88.95%	<b>&lt;0.001</b>
Nausea in the IPP	14.29%	4.74%	<b>0.003</b>
Nausea 1D	9.33%	4.84%	0.134
Vomit in the IPP	6.63%	3.16%	0.179
Vomit 1D	4.69%	2.65%	0.431

IPP = immediate postoperative period; 1D = first postoperative day.  
Bold represents the significant values.

procedure, to reduce the preoperative fasting time, which was about 8 h shorter in Phase 3. Total fasting also decreased significantly, from 29.7 h to 19.9 h. Fasting time is detrimental to post-surgical recovery, interfering with ambulation, increasing paralytic ileus, worsening healing and increasing muscle consumption, among other changes in the patient's physiology [10,11].

Proper fluid administration reduces the number of postoperative complications and hospital stay, helps in the early return of peristaltic movements and flatus, reduces the number of episodes of nausea, vomiting and postoperative pain [12]. We observed that the hospital was able to observe the recommendation of maintaining a restrictive fluid delivery regimen, i.e. less than 1.75 L/day postoperatively [12,13], with 85% of patients in Phase 3 were in “zero balance” or in the restrictive regimen, and the low complication rate was maintained. The use of urinary catheters was already adequate in Phase 1, and maintained in Phase 3, according to the recommendation in the literature (about 18 h) [14].

We considered as adequate the use of analgesics associated with anti-inflammatories and opioids for large surgeries, i.e., the analysis of adequacy took into consideration the surgery size, since analgesia requirements may vary according to the procedure and individually [15]. We observed that, although patients' characteristics and surgery types were similar between phases, in Phase 3 pain control was adequate more frequently, and there were significantly less pain episodes.

As poor pain management can result in nausea and vomit as side effects, these are frequent symptoms in operated patients [16]. We verified if nausea and vomit prophylaxis was adequate after the implementation of the ORIGAMI, and we observed that two goals were reached: the systematic usage of prophylaxis and the reduction of immediate postoperative nausea. However, the episodes of vomiting were still frequent, and the reasons for this should be further investigated. Maybe, once again, this has to do with inadequate registering in medical charts, something to be considered in public hospitals operating with full capacity.

Despite the positive findings reported above, we noticed a critical flaw regarding antibiotic management. This is because the exact time and date of antibiotic administration was not properly

registered in the medical records before surgery. Even after the implementation of the ORIGAMI project, when all staff were informed about the importance of the protocol modification, data registering on medical charts was still incomplete in Phase 3, precluding the analysis of antibiotic prophylaxis adequacy. We conclude that adequate registering of the drug, dosage and time of administration should be required both in preoperative and postoperative care from all members of the healthcare staff.

One limitation of this study was the fact that it was based on medical records review. But this is not a major limitation, since our objectives were not to investigate the effectiveness of one specific procedure, but rather, to observe the general changes in clinical outcomes after the implementation of a whole set of procedures, organized in the ORIGAMI project. We believe that the initiative was successful in improving postoperative clinical outcomes and hospital stay.

In this study, we observed significant improvements in clinical outcomes after the implementation of a multimodal protocol for perioperative care in the gynecological ward of a public university hospital in Brazil. The protocol implementation was associated with reductions in fasting time, bowel preparation, administration of fluids, pain, nausea and hospitalization time.

#### Disclosure statement and conflicts of interest

None.

#### References

- [1] Kehlet H, Wilmore DW. Multimodal strategies to improve surgical outcome. *Am J Surg* 2002;183(6):630–41.
- [2] Kehlet H, Wilmore DW. Evidence-based surgical care and the evolution of fast-track surgery. *Ann Surg* 2008;248(2):189–98.
- [3] Kehlet H, Wilmore DW. Fast-track surgery. *Br J Surg* 2005;92(1):3–4.
- [4] Wodlin NB, Nilsson L. The development of fast-track principles in gynecological surgery. *Acta Obstet Gynecol Scand* 2013;92(1):17–27.
- [5] Bicudo-Salomão A, Meireles MB, Caporossi C, Crotti PLR, Aguilar-Nascimento JE. Impacto do projeto acerto na morbi-mortalidade pós-operatória em um hospital universitário [Impact of the acerto project in the postoperative morbi-mortality in a university hospital]. *Rev Col Bras Cir* 2011;38(1):3–10.
- [6] Nelson G, Altman AD, Nick A, Meyer LA, Ramirez PT, Achdari C, et al. Guidelines for postoperative care in gynecologic/oncology surgery: enhanced Recovery after Surgery (ERAS®) Society recommendations—Part II. *Gynecol Oncol* 2016;140(2):323–32.
- [7] Nygren J, Thacker J, Carli F, Fearon KC, Norderval S, Lobo DN, et al. Guidelines for perioperative care in elective rectal/pelvic surgery: enhanced Recovery after Surgery (ERAS®) Society recommendations. *World J Surg* 2013;37(2):285–305.
- [8] Costa HCBAL, Santos RL, Aguilar-Nascimento JE. Resultados clínicos antes e após a implantação do protocolo ACERTO [Clinical outcome before and after the implementation of the ACERTO protocol]. *Rev Col Bras Cir* 2013;40(3):174–9.
- [9] Caprini JA. Thrombosis risk assessment as a guide to quality patient care. *Disease-a-Month* 2005;51(2–3):70–8.
- [10] Smith I, Kranke P, Murat I, Smith A, O'Sullivan G, Søreide E, et al. Perioperative fasting in adults and children: guidelines from the European Society of Anaesthesiology. *Eur J Anaesthesiol* 2011;28(8):556–69.
- [11] Hausel J, Nygren J, Thorell R, Lagerkranser M, Ljungqvist O. Randomized clinical trial of the effects of oral preoperative carbohydrates on postoperative nausea and vomiting after laparoscopic cholecystectomy. *Br J Surg* 2005;92(4):415–21.
- [12] Jia FJ, Yan QY, Sun Q, Tuxun T, Liu H, Shao L. Liberal versus restrictive fluid management in abdominal surgery: a meta-analysis. *Surg Today* 2017;47(3):344–56.
- [13] Raghunathan K, Singh M, Lobo DN. Fluid management in abdominal surgery: what, when, and when not to administer. *Anesthesiol Clin* 2015;33(1):51–64.
- [14] Ahmed MR, Sayed Ahmed WA, Atwa KA, Metwally L. Timing of urinary catheter removal after uncomplicated total abdominal hysterectomy: a prospective randomized trial. *Eur J Obstet Gynecol Reprod Biol* 2014;176:60–3.
- [15] Kuusniemi K, Pöyhä R. Present-day challenges and future solutions in postoperative pain management: results from PainForum 2014. *J Pain Res* 2016;9: 25–36.
- [16] Chou R, Gordon DB, de Leon-Casasola OA, Rosenberg JM, Bickler S, Brennan T, et al. Management of postoperative pain: a clinical practice guideline from the American pain society, the American society of regional anesthesia and pain medicine, and the American society of anesthesiologists' committee on regional anesthesia, executive committee, and administrative council. *J Pain* 2016;17(2):131–57.

**Table 5**  
Characteristics of groups regarding hospitalization time.

Time	Phase 1 (n = 197)	Phase 3 (n = 190)	p
Hospitalization (median [IQ])	52.85 h [50.13 h - 76.8 h]	51.65 h [48.53 h - 71.3 h]	<b>0.003<sup>a</sup></b>
Hospitalization > 72 h (%)	32.99%	23.16%	<b>0.042<sup>b</sup></b>

SD = standard deviation; IQ = interquartile range.

Bold represents the significant values.

<sup>a</sup> Mann-Whitney.

<sup>b</sup> Chi Square.