

Fast track vaginal surgery

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Acta Obstet Gynecol Scand 2002; 81: 138–146. © Acta Obstet Gynecol Scand 2002

Objective. Our aim was to describe the need for postoperative hospitalization after vaginal surgery for utero-vaginal prolapse with well-defined charts for postoperative care.

Design. A prospective, descriptive study. Consecutive women admitted for first-time vaginal surgery for utero-vaginal prolapse at a public university hospital in Copenhagen, Denmark, underwent surgery and postoperative care in a fast track setting from September 15, 1999 to June 15 2000.

Methods. A multimodal rehabilitation model with emphasis on information, standardized general anesthesia, reduced surgical distress, optimized pain-relief, early oral nutrition and ambulation, minimal use of indwelling catheter and vaginal packing.

Outcome measures. Postoperative hospital stay, complications, re-admission, success rate, patients' satisfaction and acceptability.

Results. Forty-one women with a median age of 69 years (range, 44–88 years) were included. All underwent anterior and/or posterior vaginal repair. Nineteen (46.3%) underwent vaginal hysterectomy, and eight (19.5%) underwent the Manchester procedure. Postoperative hospital stay was median 24 hr. Only three (7.3%) were discharged later than 48 hr. No re-admissions occurred. The most frequent complications were urinary retention exceeding 450 ml, and urinary tract infection (12.2%, and 9.8%, respectively). Short-term success rate was 97.6%. Patients' satisfaction rates were 85.4–95.1%. The median score of acceptability was 10 on a 0–10 points scale.

Conclusion. The need for postoperative hospitalization was median 24 hr after vaginal surgery in a fast track setting, independently of the complexity of the procedure performed. Short-term success rate, satisfaction rates, and acceptability were all excellent. Follow up has been established to evaluate long-term success rates and recurrence.

Key words: hospital stay; postoperative care; utero-vaginal prolapse and surgery; vaginal hysterectomy; vaginal repair

Submitted 29 May, 2001

Accepted 17 September, 2001

Traditionally, surgery by the vaginal route implicates shorter hospitalization than following the abdominal route, and a median postoperative hospital stay of 5–9 days has been reported, with a decreasing trend during the past decades (1–5).

At our department, as well as on a national basis in Denmark, the postoperative hospital stay

in 1996–1998 was median 4 days after vaginal surgery for utero-vaginal prolapse (independently of the complexity of the procedure) according to statistics from the National Board of Health.

The application of fast track regimens in unselected in-hospital patients, with a postoperative hospital stay of 24–48 hr after vaginal surgery, have been sparse in the literature (6,7) (Medline search January 1966 to April 2001). Others have reported a short hospital stay after vaginal surgery, but only in selected patients with no concomitant medical diseases, and with substantial follow up with phone calls, home visits, etc. (8–11).

Abbreviations: BSO: bilateral salpingo-oophorectomy; HRT: hormonal replacement therapy; PONV: postoperative nausea and vomiting; SIC: sterile intermittent catheterization; PRV: postvoid residual volume; VAS: visual analog scale; BMI: body mass index; Hgb: hemoglobin.

A multimodal rehabilitation model, with emphasis on information, standardized general anesthesia, reduction of surgical stress response, efficient pain relief, early oral nutrition and ambulation, avoidance of tradition-based treatment (e.g. catheters, meshes and drains), and non-restrictive recommendations for the convalescence period after gastro-intestinal surgery without any change in surgical procedures, has been described to obtain short postoperative hospitalization and convalescence (12). The aim of this study was, therefore, to describe the need for postoperative hospitalization after vaginal surgery for utero-vaginal prolapse in a fast track setting with well-defined charts and milestones for postoperative care and recovery based on the multimodal rehabilitation model.

Design and material

A descriptive, prospective study was conducted at the department of Obstetrics and Gynecology in a Danish, public, university hospital from 15 September, 1999 to 15 June, 2000.

Consecutive women admitted for first-time vaginal surgery for utero-vaginal prolapse were included. Prolapse staging according to the International Continence Society (13) (grade II = prolapse to in between 1 cm above and 1 cm below hymen), the indication for surgery, as well as the procedures to be undertaken was made, prior to inclusion.

Exclusion criteria were blindness, deafness, severe dementia and non-Danish language. Furthermore, planned, concomitant, major surgery at the time of vaginal surgery, e.g. laparotomy or vulvectomy, was a reason for exclusion.

Methods

The study nurse and the main author were the main figures in relation to information, early postoperative care and follow up.

Information

Emphasis was put on thorough oral and written information. A new patient information folder was designed, describing the expected course and duration of hospitalization, possible postoperative discomfort and complications, and risk of recurrence of prolapse. A section was included, describing prophylactic self-care steps to reduce risk of recurrence of prolapse, e.g. correct lifting technique, pelvic muscle exercises, and to avoid overweight, constipation, and bronchitis.

Vaginal estrogen

Genuine estrogen for vaginal application was prescribed to postmenopausal women not already

treated with vaginal or systemic hormonal replacement therapy (HRT), and to premenopausal women as indicated.

Thrombosis prophylaxis

Elastic stockings and low-dose heparin were used for antithrombosis prophylaxis during hospitalization.

Standardized general anesthesia

No premedication was offered. The anesthesia was standardized, using remifentanyl 1 µg/kg/min and propofol 10 mg/ml 20–30 ml/min. Ventilation was ensured, using a laryngeal mask. Intravenous fluids were limited to a maximum of 1000 ml of sodium chloride perioperatively. If blood loss exceeded 500 ml, 500 ml of hydroxyethyl starch was added.

Alternative anesthesia

On contraindications to the use of laryngeal mask, the patient was either intubated, or spinal anesthesia was offered.

Surgical procedures

Standard procedures were used, i.e. posterior colporrhaphy (with or without perineorrhaphy), anterior colporrhaphy (with or without Kelly sutures), enterocele repair, the Manchester procedure, vaginal hysterectomy with or without bilateral salpingo-oophorectomy (BSO), McCall suture (15–18).

Antibiotics

If $\geq 10^4$ bacteria were detected per milliliter in a preoperative midstream specimen of urine, relevant antibiotics were prescribed from one day preoperative to one day postoperative. A single dose of 1.5 g of cefuroxim was used for antibiotic prophylaxis intraoperatively if catheterization was performed with known bacteriuria $< 10^4$ organisms per milliliter, and in cases where an intraperitoneal procedure was undertaken.

Prophylaxis of intestinal paralysis and postoperative nausea and vomiting (PONV)

Sodiumdocusate and magnesium oxide were administered one day preoperative. Magnesium oxide was prescribed for 2 weeks postoperative. Ondansetron 4 mg was given intraoperatively. Repeat dose of ondansetron or metoclopramide was offered postoperatively on request.

Pain prophylaxis

Pudendal nerve block with 10 ml of 0.5% bupivacaine was applied bilaterally in all cases for early postoperative pain prophylaxis. In cases where vaginal hysterectomy or the Manchester procedure was undertaken, infiltration of the uterosacral ligaments with 5 ml of 0.5% bupivacaine was added bilaterally. Furthermore, if no contraindications occurred, ketorolac 30 mg and sufentanil 10 µg were given intravenously 30 and 10 min, respectively, prior to termination of anesthesia. A repeat dose of sufentanil was offered on request during the observation period in the recovery ward. Paracetamol retard 2 g, and ibuprofen retard 600 mg were prescribed 12 hourly during hospitalization, and for a maximum of 1 week after discharge. Diclofenac-misoprostol 75 mg was prescribed 12 hourly in cases where ibuprofen was not tolerated due to dyspepsia or prior peptic ulcer. Tablet morphine 10 mg was offered maximally three times daily on request during hospitalization.

Postoperative scheme for nutrition

Nutrition included 1–1.5 l orally, including one to two cups of protein drink, and one to two meals on the day of surgery. Next, 1.5–2 l orally, and three meals from the day after surgery. If still hospitalized, or if the scheme could not be fulfilled, supplementary protein drinks were offered.

Postoperative scheme for ambulation

Ambulation induced 2–3 hours out of bed on the day of surgery. 6–8 hours of ambulation, and 2 to 3 walks three times on the day after surgery. Hereafter normal ambulation was expected at home.

Vaginal packing

A vaginal pack was only applied for hemostatic purposes.

Catheterization

A postoperative indwelling catheter was only used routinely in the case of vaginal packing or spinal anesthesia. Sterile intermittent catheterization (SIC) was performed as indicated, or if there had been no spontaneous voiding 6 hr postoperatively. If a patient had had three SIC postoperatively, an indwelling catheter was offered until the next morning.

Postvoid residual volume (PRV)

Postvoid residual volume was measured by ultrasound the day after surgery. Measurement of PRV was repeated if > 100 ml.

Discharge

Discharge was planned 24 hr postoperatively, as long as no complications occurred, the patient felt ready for discharge, and did not require morphine.

Follow up

The patients were not contacted by phone, and no home-visits were planned after discharge. Out-patient visits were scheduled 1 week after discharge and 1 month postoperatively only to ensure relevant research registration. Furthermore, follow up has been scheduled 1, 2, and 5 years postoperatively to evaluate long-term success rates and recurrence.

Data registration

Standardized registration forms, and evaluation questionnaires were used. Oral intake, ambulation, bowel and bladder function including PRV, and the day of normalization of these functions were registered. Pain was registered with a 0–10 cm visual analog scale (VAS) 0–3 hr postoperatively. Furthermore, pain was registered with a four-step categorical scale (i.e. no, mild, moderate and severe) at 0–3 hr postoperatively, 3–12 hr postoperatively, and thereafter daily during hospitalization. Discomfort (i.e. nausea, dizziness and fatigue) was registered with the same categorical scale at the same intervals. Reasons for delayed discharge, and readmission were also registered.

Definitions of normalized functions

Normalized fluid and solid food intake were defined as: the first day, where the scheme of nutrition was fulfilled, and no vomiting occurred after the patient returned from the recovery ward. Normalized ambulation was defined as: the first day, where the scheme of ambulation was fulfilled. Bladder function was considered normal on the day of surgery if: the patient had had spontaneous voiding (after removal of an eventual indwelling catheter), if SIC was not required, and PRV was < 100 ml. Normalized intestinal function was defined as: the day where flatus and defecation had occurred.

Success criteria

Hospital stay was defined as being successful, if the patient scored 'as expected', 'easier than expected' or 'much easier than expected' on a categorical scale, or if she felt, that no pressure was put on her towards discharge. Acceptability of how feasible the patients found our program, treatment, and advice was evaluated with a 0–10 points scale. Short-term success rate was evaluated with a five-step categorical scale. Successful outcome was defined as 'very good effect' or 'total effect' of the operation.

According to the local ethical committee who evaluated the protocol, the study did not need their approval. All patients were included after oral and written informed consent.

Statistics

In the following, discrete variables are presented in absolute numbers, and as frequencies expressed in per cent. Continuous variables are presented as medians with ranges. The Kruskal–Wallis test was used for univariate, non-parametric comparison of continuous and discrete numerical variables. Fisher's exact test was used for univariate analysis of binomial variables, comparing patients undergoing vaginal hysterectomy with patients not undergoing this procedure, and to evaluate possible risk factors to postoperative cystitis and urinary retention. Possible explanatory factors to any postoperative complication were tested in a generalized

logistic regression model (backward selection). The same model was used to test for explanatory factors to cystitis and urinary retention. Odds ratios with 95% confidence limits were calculated. A *p*-value <0.05 was considered statistically significant. All analyzes were performed using the SAS 6.12 software (Statistical Analysis System®, Cary, North Carolina, USA).

Results

Patients

During the study period, 69 patients were admitted for first time vaginal prolaps surgery.

Nine of these did not wish to participate in a scientific study. Eleven were not enrolled, mainly due to our lack of capacity (courses, vacation, etc.). Eight patients were excluded in accordance with our exclusion criteria.

The study population hereafter consisted of 41 consecutive patients with a median age of 69 years (range, 44–88 years).

Baseline data and other characteristics

Baseline data. Baseline data and degree of prolapse are listed in Table I according to 10-year age groups. Four had had a prior abdominal hysterectomy due to fibroids and/or menorrhagia, and two had had bilateral salpingo-oophorectomy (BSC). The PVR was median 26 ml (range, 0–282 ml) preoperatively.

Table I. Baseline data and clinical characteristics among 41 consecutive women undergoing vaginal prolapse surgery in a fast track setting

Characteristics	Age groups					All patients
	40–49	50–59	60–69	70–79	80–89	
Age group (years)	40–49	50–59	60–69	70–79	80–89	44–88
Number of patients (<i>n</i>)	4	6	11	15	5	41
Parity (<i>n</i>)	1.5 (1–4)	2.5 (2–3)	3 (1–5)	2 (1–3)	2 (1–4)	2 (1–5)
Born a child >4000 g (<i>n</i>)	2	2	4	3	1	12
Episiotomy and/or ≤ grade II perineal rupture (<i>n</i>)	3	4	7	8	2	24
HRT vaginal/systemic (<i>n</i>)	1/1	3/2	10/0	14/1	5/0	33/4
Sexually active (<i>n</i>)	3	4	4	2	0	13†
Strenuous work (<i>n</i>)*	2	4	7	7	1	21
Standing work (<i>n</i>)	2	4	6	9	4	25
Active employment (<i>n</i>)	4	6	2	1	0	13
BMI [median (range)] kg/m ²	21.7 (21.0–24.2)	24.3 (21.3–30.1)	27.9 (24.1–32.8)	26.3 (21.5–31.2)	23.4 (21.9–27.1)	26.1 (21.0–32.8)
Concomitant disease (<i>n</i>)‡	2	3	9	13	5	32
Cystocele ≥ grade II (<i>n</i>)	1	5	8	13	2	29
Rectocele ≥ grade II (<i>n</i>)	1	4	6	8	3	21
Uterus prolapse ≥ grade II (<i>n</i>)	3	2	7	12	3	27
Preoperative PRV > 50 ml (<i>n</i>)	4	3	3	9	2	21

*For Example, factory workers, cleaning staff, kindergarten staff, nurses and other health care personal.

†Four of the 13 patients had no partner at the time of the study.

‡Hypertension *n* = 15, other cardio-vascular disease *n* = 6, obstructive lung disease *n* = 4, thyroid disease *n* = 5, depression *n* = 2, breast cancer *n* = 3, other cancer *n* = 1, NIDDM *n* = 4, severe arthritis *n* = 8, prior stroke *n* = 2, vertigo *n* = 3, anemia *n* = 1, other *n* = 6.

HRT: hormonal replacement therapy; BMI: body mass index; PRV: postvoid residual volume.

Symptoms. In all patients, prolapse was the major symptom, and 36 (87.8%) reported that 'something was coming out of the vagina'. Twenty patients (48.8%) reported incontinence; however, only eight (19.5%) had daily episodes of incontinence, i.e. mixed type ($n = 3$), urge type ($n = 1$), and grade I stress incontinence ($n = 4$).

Degree of prolapse. Thirty-five patients (85.4%) had a cystocele, i.e. one non-graded, five grade I, 12 grade II, 15 grade III, and two grade IV. Thirty patients (73.2%) had a rectocele, i.e. one non-graded, eight grade I, 14 grade II, five grade III, and two grade IV. Thirty patients (73.2%) had uterine prolapse, i.e. one non-graded, three grade I, 14 grade II, 10 grade III, and three grade IV.

Surgical procedures and anesthesia

Surgical procedures. Eight different surgeons performed median five procedures (range, 1–10). Different combinations and number of procedures, and surgical facts, are listed in Table II. Nineteen (46.3%) underwent vaginal hysterectomy and vaginal repair, eight (19.5%) underwent vaginal repair with the Manchester procedure, and 14

(34.1%) underwent vaginal repair. The estimated blood loss was median 100 ml (range, 10–600 ml). The total length of the removed uteri was median 8 cm (range, 6–14 cm).

Anesthesia. Thirty-five patients (85.4%) were operated under standardized general anesthesia. Intubation was necessary in two patients (4.9%). The amount of propofol given was median 494 mg (range, 283–865 mg), and the amount of remifentanyl given was 6.02 mg (range 3.01–10.32 mg). Four patients (9.8%) had spinal anesthesia.

Vaginal packing and catheterization

Vaginal packing. In the case of vaginal packing (Table II), this was withdrawn after median 3 hr (range, 1–10 hr). Patients undergoing vaginal hysterectomy were not more likely to have vaginal packing, and neither were patients undergoing anterior colporrhaphy.

Catheterization. In the case of indwelling catheter postoperatively (Table II), this was withdrawn after median 2 hr (range, 1–6 hr). Eight patients (19.5%) had one SIC, while four (9.8%) had three SIC. In five patients (re-) catheterization with an

Table II. Surgical facts, postoperative use of vaginal packing and indwelling urethral catheter, and postoperative voiding complications among 41 consecutive women undergoing vaginal surgery according to the complexity of the procedure performed

Procedure	No. of procedures (n)	No. of surgeons (n)	Surgery time med (range) (min)	Drop in Hgb med (range) (mmol/l)	Intra-op. Cefuroxim (n)	Vaginal packing (n)	Post-op. catheter (n)	Post-op SIC (n)	Retention ≥ 450 ml (n)	Post-op. cystitis (n)
Anterior repair	2	2	31 (24–38)	0.75 (0.6–0.9)	0	0	1	1	0	1
Posterior repair \pm enterocele repair	7	4	59 (32–82)	0.8 (0.0–1.4)	3	1†	1	2	1	1
Anterior + posterior* repair	5	4	70 (45–115)	0.7 (0.2–1.6)	1	1	2	5	2	1
Manchester + anterior repair	2	1	70.5 (61–80)	0.6 (0.6)	0	1	0	0	0	0
Manchester + anterior + posterior* repair	6	5	92 (60–105)	0.65 (0.3–1.3)	5	3	4	0	0	0
Vaginal hysterectomy + anterior repair \pm McCall	9	5	79 (50–140)	0.9 (0.7–2.2)	9	1	1	2	0	0
Vaginal hysterectomy + anterior + posterior* repair \pm McCall +	8	5	113 (63–144)	1.4 (–0.1–2.4)	7	4	4	4	2	1
Vaginal hysterectomy + anterior + posterior* repair \pm McCall + BSO	2	2	125.5 (95–156)	1.25 (0.7–1.8)	2	0	1	1	0	0
All procedures	41	8	82 (24–156)	0.8 (–0.1–2.4)	27	11	14	15	5	4

* \pm perineorrhaphy.

† Applied 1 hr postoperatively due to bleeding.

n : number of patients; BSO: bilateral salpingo-oophorectomy; Hgb: hemoglobin.

indwelling urethral catheter was necessary for less than median 24 hr postoperatively. Eleven patients (26.8%) were not catheterized neither intra nor postoperatively, and did not need SIC. Patients undergoing vaginal hysterectomy were not more likely to have indwelling urethral catheter, and neither were patients undergoing anterior colporrhaphy.

Complications

There were no major complications. No re-operations, and no vault infections occurred.

Urinary retention. Five patients (12.2%) had urinary retention exceeding 450 ml (range, 600–1125 ml). Two of these had repeatedly, large PRV, and needed intermittent self-catheterization for 7 and 12 days, respectively. The latter had pyrexia of unknown cause on the third and fourth postoperative day, and was treated with antibiotics. In the remaining 39 patients (95.1%), PRV was median 20 ml (range, 0–88 ml) by the time of discharge.

Cystitis. Four patients (9.8%) had cystitis within 1 month postoperatively. Another two patients were treated due to suspicion of cystitis, but their midstream urinary samples were negative. None of the patients with cystitis had preoperative PRV > 50 ml or postoperative urinary retention \geq 450 ml.

Prolonged pudendal nerve block. Two patients (4.9%) experienced prolonged pudendal nerve block for 8 and 24 hr, respectively. In the first case ambulation was impaired during the first 6 hr postoperatively, while the latter experienced *de novo* incontinence for 24 hr postoperatively. No other patients experienced *de novo* incontinence.

Bleeding and hematomas. Two patients developed some fresh bleeding (one primary 1 hr postoperatively, and one secondary 3 weeks postoperatively). Neither of these had hematomas. Two patients (one of whom had a vaginal pack, and one who did not) developed a small hematoma < 4 cm. None of the patients had the need for blood transfusion.

Other. One patient had a small rectal serosa lesion, which was sutured primarily.

Risk factors to complications

The risk of any postoperative complication was tested in a generalized logistic regression model including age/10 years, concomitant medical disease, body mass index (BMI) > 26 kg/m², vaginal hysterectomy, anterior colporrhaphy, operation time/10 min, blood loss in terms of drop in hemoglobin (Hgb) in mmol/l, intraoperative cefuroxim, postoperative indwelling urethral catheter, and preoperative PRV > 50 ml. Increasing blood loss: $p =$

0.0189, OR = 10.2 (95%CL, 1.47; 71.2), decreasing age/10 years: $p = 0.0168$, OR = 2.8 (95%CL, 0.20; 6.34), and BMI > 26 kg/m²: $p = 0.0269$, OR = 7.4 (95%CI, 1.26; 43.6), were significant explanatory factors to any postoperative complications.

In the univariate analysis there was a substantial trend towards increased risk of cystitis among patients who needed (re-) catheterization with an indwelling urethral catheter postoperatively [$p = 0.066$, OR = 11.3 (95%CL, 1.15–112)]. Although three of the four patients who had postoperative cystitis did not have intraoperative cefuroxim, this difference was not significant [$p = 0.11$, OR 7.1 (95%CL, 0.7; 75.9)]. In the generalized logistic regression model using the same explanatory factors as above, none of the explanatory factors contributed significantly to the risk of neither postoperative cystitis nor urinary retention > 450 ml.

Postoperative discomfort and physical rehabilitation

Pain, PONV, dizziness and fatigue. The median VAS, pain score was 2.7 (0–10) 0–3 hr postoperatively. Eighteen (43.9%) required supplementary sufentanil during this period, while only 12 (29.3%) requested morphine 1–2 times, 3–12 hr postoperatively. Pain during activity is illustrated in Fig. 1. The same pattern was shown for PONV and dizziness. Patients who underwent vaginal hysterectomy reported significantly more pain at rest ($p = 0.0168$) and during activity ($p = 0.0331$) 0–3 hr postoperatively. Fatigue was the most pronounced symptom of discomfort. Twenty-one (51.2%) scored 'moderate' or 'severe fatigue' 3–12 hr postoperatively. However, 24 and 48 hr postoperatively, only 10 (24.4%) and one (2.4%), respectively, scored 'moderate' or 'severe fatigue'.

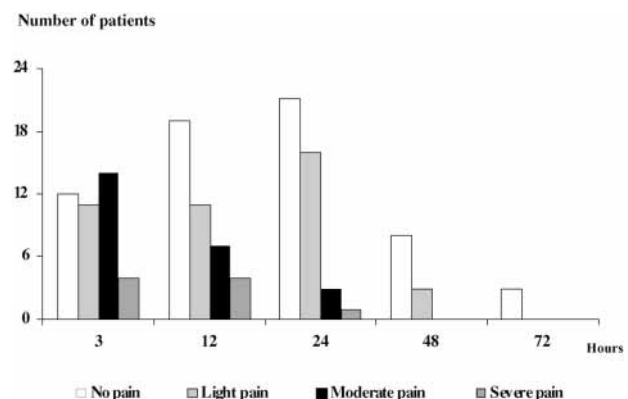


Fig. 1. Pain during activity evaluated with a categorical scale at 0–3 hr postoperatively, 3–12 hr postoperatively, and thereafter once a day during hospitalization after vaginal prolapse surgery in a fast track setting.

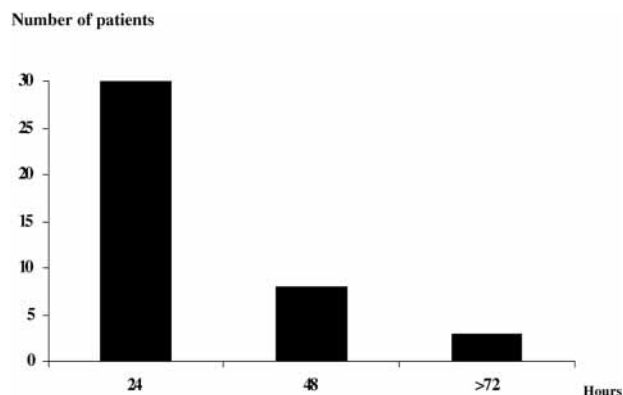


Fig. 2. Postoperative hospital stay among 41 consecutive women undergoing vaginal prolapse surgery in a fast track setting.

Nutrition and ambulation. The median oral fluid intake was 1700 ml (range, 725–3350 ml) 0–12 hr postoperatively. Thirty-one (75.6%) of the patients had been out walking within 3 hr postoperatively. The main causes of impaired ambulation were fatigue, dizziness and pain.

Normalization of functions. With the exception of defecation, all other registered functions, i.e. drinking, eating, ambulation, and flatus, were normalized within median 12 hr postoperatively. In 39 patients (95.1%), all functions with the exception of defecation were normalized within 48 hr postoperatively. Thirty-four (82.9%) had normalized intestinal function within 48 hr postoperatively.

Postoperative hospital stay

The time of discharge is presented in Fig. 2. The median postoperative hospital stay was 24 hr, independently of the complexity of the surgery performed. Thus, 15 of the 19 patients (78.9%) who underwent vaginal hysterectomy and vaginal repair, and 15 of the 22 patients (68.2%) who underwent vaginal repair, either alone or as the Manchester procedure, were discharged 24 hr postoperatively. Twelve hours postoperatively 14 patients (34.1%) reported, that they were ready for discharge the following day. Among the eight patients (19.5%) who were discharged 48 hr postoperatively, the reason for postponing discharge was 'patient's wish' due to fatigue and/or dizziness and/or feeling of insecurity in six cases, and 'voiding problems' in two cases. The patients discharged later than 72 hr postoperatively, included the two patients trained to perform intermittent self-catheterization, and one patient with known hypertension, prior stroke, and voiding problems 48 hr postoperatively,

who needed cardiac monitoring due to syncope, concluded to be vaso-vagal.

Follow up, satisfaction and acceptability

None of our patients were re-admitted during the convalescence period. Three patients had one extra outpatient visit each. Among these were the two patients performing intermittent self-catheterization. Four patients had one visit at their general practitioner within 1 month postoperatively, due to adverse events, i.e. cystitis or dyspepsia.

Thirty-eight (92.7%) found that the postoperative hospital stay had been 'as expected', 'easier than expected' or 'much easier than expected'. Thirty-five (85.4%) found that the length of hospital stay had been 'convenient', while six (14.6%) found that it had been 'a little too short'. Only two patients felt that 'a little pressure was put on them towards discharge', and among them was the one patient discharged 8 days postoperatively. The subjective short-term success rate was 97.6%. Finally, on a 0–10 points scale of 'how acceptable our programme and advice had been', the median score was 10 (range, 0–10).

Discussion

As gynecologists, we do have a lot of tradition-based habits and recommendations without any evidence of positive effects (18).

Several factors may influence morbidity, hospital stay and the speed of restitution after surgery (12,19,20). The surgical stress response, postoperative pain, immobilization and semi-starvation cause a catabolic state and organ distress, i.e. impaired cardio-vascular, pulmonary and intestinal function, with resultant fatigue, PONV and risk of complications. Other factors, that might have an impact on the speed of restitution, are the doctors' advice and restrictions for the convalescence period.

It is well documented that routine use of prophylactic antibiotics at the time of vaginal hysterectomy reduces postoperative pelvic infection (21). In accordance with this, none of our patients undergoing this procedure had vault infection.

Previously, it was common to leave an indwelling catheter for several days after vaginal surgery (22,23), but even in recent publications 4–5 days of catheterization has been reported (2,24). However, several studies have shown, that routine use of a postoperative indwelling catheter is not necessary, that it may be reserved for selected subgroups of patients, and that a group of non-catheterized women have significantly fewer cases of re-catheterizations, cystitis and postoperative fever as com-

pared with a catheterized group (6,25,26). Our findings (although being insignificant) support this. The need for intraoperative catheterization during vaginal surgery is unknown, and has not been documented. Many surgeons do, however, prefer to install a urethral catheter during surgery, in order to localize the urethra and bladder neck, and to ensure an empty bladder. In our series, 11 patients were not catheterized at any time. Nine of these had a vaginal hysterectomy and/or anterior colporrhaphy. We had no problems localizing the urethra or bladder neck in these patients, and an empty bladder was easily ensured by asking the patient to void just prior to induction of anesthesia, and by minimizing the use of intravenous fluids. The necessity for an early postoperative indwelling catheter is also unknown. However, if an indwelling catheter is not used postoperatively, the patients must be fully informed to call on the attention of the staff to ensure bladder emptying, as a substantial number of patients will experience the need for minimum one SIC postoperatively.

A vaginal pack for removal 1 day postoperatively, has traditionally been used routinely, by most gynecologists in Denmark (18). This treatment is, however, not evidence based, as it has never been shown to prevent hematomas or postoperative bleeding episodes, nor the need for reoperation. In accordance with this, we only registered two small hematomas in our series – one in a patient who did, and one in a patient who did not have vaginal packing. If a vaginal pack is left to ensure hemostasis, it most certainly will have served its purpose within a few hours. If compression is withheld for several hours, it may theoretically cause pressure-induced ischemia, and insufficient wound healing, which may increase the risk of relapse. However, further studies have to be conducted to investigate any possible coherence.

One to two decades ago, it was common to immobilize patients for a few days to 1 week depending on the type of surgery performed, and solid food was not offered until the day after major surgery. There has been no evidence of any positive effect of such treatment. On the contrary, such tradition-based treatment may increase morbidity by causing a catabolic induced loss of muscle mass, fatigue, and impairment of cardiopulmonary and intestinal function. Also, it will cause an increased risk of thrombosis. The majority of our patients were able to drink, eat, and be out of bed sufficiently even on the day of surgery. Although fatigue was the most pronounced symptom, it was easily overcome.

The application of a Pudendal nerve block and infiltration of the utero-sacral ligaments has not earlier been described for early postoperative pain

relief. Further investigations have to be conducted to evaluate the effect of this type of postoperative pain treatment.

Although the majority of our patients (78.0%) had one or more concomitant medical diseases, and despite the fact that many of them were elderly women living alone, the need for postoperative hospitalization was reduced from median 4 days to median 24 hr overnight with the multimodal rehabilitation model, independently of the complexity of surgery performed. We did not require any special care or observation after discharge. As we had no re-admissions, we found that the short time of postoperative observation was sufficient to diagnose the minority of patients (7.3%) with complications requiring further hospitalization.

Not surprisingly, the main reason for delayed discharge was voiding problems. In a small number of patients, psychosocial factors may, however, postpone discharge.

The majority of our patients commented that: 'The best thing about the whole program, was the short need for hospitalization'.

The impact of the presented fast track program on recurrence is unknown. Long-term follow up is therefore mandatory, and is indeed being carried out.

Although the number of patients in the present study was too small for fundamental conclusions, the results suggest, that patients undergoing lower compartment vaginal reconstructive surgery, as well as major vaginal prolapse surgery, are candidates for treatment in a fast track setting according to the multimodal rehabilitation model.

Conclusion

In a series of 41 consecutive patients, of whom 19 (46.3%) underwent vaginal hysterectomy, the multimodal model led to an overnight reduction in postoperative hospital stay from median 4 days to median 24 hr after vaginal prolapse surgery. Thirty-eight patients (92.7%) were discharged within 48 hr postoperatively. Reasons for delayed discharge were patients' wishes and voiding problems. The multimodal rehabilitation model was well accepted by the patients, and short-term subjective success rate was 97.6%.

Acknowledgments

Grateful thanks to Kim Krogsgaard, M.D., D.MSc, director of the Clinical Research Unit for kindly housing the main author at the Clinical Research Unit, and to Torben Mogensen, M.D., D.MSc for excellent anesthesiological counseling. All our colleagues at the department of Obstetrics and Gynecology, and the department of Anesthesiology are gratefully acknowledged for their excellent assistance in pre, peri, and postop care.

The study was supported with grants from H:S Research Fund, Dagmar Marshalls Fund, and King Christian the Tenth Fund.

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