

## The Participation of Pharmacists in a Team to Introduce a Clinical Pathway to Laparoscopic Cystectomy in Obstetrics and Gynecology

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In the Department of Obstetrics and Gynecology at our hospital, a team of doctors, pharmacists, nurses, and other medical staff was established to prepare a clinical pathway for laparoscopic cystectomy. Various data on clinical charts including the use of drugs were collected from 57 patients by pharmacists and nurses. Based on the analysis of these data, hospitalization period, method of preoperative bowel preparation, time to initiation of food intake, duration of antibiotic administration, and time and content of pharmaceutical instructions to patients of dosage and administration were determined. Criteria for variances requiring the doctor's directions were determined for fever, wound pain, and vomiting. The clinical pathway established here allows of not only the efficient and uniform care of patients, but also the active exchange of opinions among members of the medical team. Moreover, most patients who replied to a questionnaire said that they were at ease during hospitalization because they had received detailed information about the clinical pathway including the use of drugs before surgery. Thus, the participation of pharmacists on a medical team that is introducing a clinical pathway is particularly important because the use of drugs and pharmaceutical care are an important part of good patient care.

**Key words**—clinical pathway; laparoscopic cystectomy; medical team; pharmacist; variance

### INTRODUCTION

The concept of a clinical pathway, or a critical pathway, was originally established in the United States as a system for managing the manufacturing processes in a factory focusing on the rate-limiting (critical) process.<sup>1,2</sup> During the 1980s, Zander et al. introduced it into the clinical field to standardize medical services.<sup>1,3</sup> Thereafter, clinical pathways rapidly spread throughout the United States primarily as a method of improving cost-effectiveness.<sup>2,3</sup> The use of a clinical pathway standardized the details of treatment, and, therefore, facilitated the offer of qualitatively uniform medical service as well as cost-effectiveness.<sup>1</sup> Clinical pathways were recently introduced in Japan to help in obtaining informed consent, to decrease health care costs, and to improve the communication among members of the medical staff.<sup>1-6</sup> Nurses used to be primarily responsible for the establishment of clinical pathways. However, problems sometimes occurred during the practical use of clinical pathways due to insufficient prior agreement with other members of the medical staff, which resulted in the discontinuation of clinical pathways.<sup>2,7</sup>

Laparoscopic surgery is frequently performed in the Department of Obstetrics and Gynecology at our hospital. However, each doctor had different pre- and postoperative treatment requirements resulting in complicated nursing and instructions on drug management. Therefore, we attempted to introduce a clinical pathway in our hospital that involved all of the medical staff, including pharmacists, from inception.

### METHODS

#### 1. Organization of a Team to Introduce a Clinical Pathway and Selection of Objective Surgeries

Among medical staff members in the Department of Obstetrics and Gynecology, 2 doctors, including the chief of the Department, 2 pharmacists, including a pharmacist who was in charge of the department, and 7 nurses, including the chief and sub-chief nurses, were selected to organize a team to introduce a clinical pathway and meet periodically.

Among the patients undergoing laparoscopic surgery, cystectomy, adhesiolysis, and salpingo-oophorectomy (hereinafter referred to as laparoscopic surgery) were selected as objective surgeries for the

clinical pathway because they are frequently performed and the postoperative courses of these surgeries are mostly common among them.

## 2. Investigation of Clinical Charts and Determination of Standard Ranges for Clinical Observations

The clinical charts of 57 patients who had undergone laparoscopic surgery in our department between April 1999 and March 2000 were investigated to reevaluate our previous care processes for these patients.

From the previous clinical charts, points to be unified in the care process, especially on the method and timing of pretreatment and postoperative drug administration, were extracted and extensively discussed. Subsequently, a standard range was determined for each clinical observation. Observations outside the standard ranges were defined as "variance" or "abnormal," and the criteria for variance that would lead to removal from the clinical pathway were listed.

## 3. Creation of a Clinical Pathway

After determining the standard ranges for clinical observations, the clinical pathway was created. In addition, we met with medical accounting clerks and simplified the items on the treatment slips, which are used for accounting. The clinical pathway was further discussed in the respective divisions of the medical staff and then its introduction was announced to everyone involved in the pathway. Moreover, the styles of records of pharmaceutical care and nursing were revised by the pharmacists and nurses, respectively.

## 4. Preparation of a Patient Leaflet that Illustrates the Clinical Pathway

We made a leaflet for patients to help to explain the hospitalization plan and each item on the treatment plan. Great care was taken to make sure that the leaflet was easily understandable for all patients.

## 5. Evaluation of the Clinical Pathway

In a pilot study, the clinical pathway was applied to a small number of patients undergoing laparoscopic surgery, and its usefulness was evaluated by the team that prepared the clinical pathway. A questionnaire was also completed by patients to evaluate the usefulness of the introduction of the clinical pathway.

# RESULTS

## 1. Investigation of Clinical Charts and Determination of Standard Ranges for Clinical Observations

Table 1 shows the basic data obtained from the investigation of the clinical charts, and Tables 2—5 show more detailed data on specific points.

1) **Hospitalization Period** As shown in Table 2, most patients were admitted to our department on Monday or Wednesday and underwent surgery the next day. Most patients were hospitalized for 5 days, and there were no problems in fixing the hospitalization period at 5 days from the clinical point of view. However, because we could not discharge patients on Friday due to administrative difficulties in our department, patients admitted on Monday were discharged on Saturday (6th hospitalization day), and those admitted on Wednesday were discharged on Sunday (5th hospitalization day).

2) **Time to Initiation of Food Intake** On the 1st postoperative day, food intake was initiated at breakfast in 33 patients (58%) and at lunch in 23 patients (42%), and the types of meals varied in each patient (Table 3). In addition, the operating time, severity of adhesions, and postoperative course were not correlated with the time to initiation of food intake or types of meals. These differences were found to be due to differences in orders from each of the doctors. Moreover, we discovered that the amount of initial food intake was quite limited in most patients who started food intake at breakfast on the day after surgery (Table 4). The postoperative course, including the time of the first postoperative gas excretion, time of urinary catheter extubation, and incidence of fever, was independent of the time to initiation of food intake. These issues were discussed by the team, and the food intake was determined to be initiated by ordinary meals from breakfast on the 1st postoperative day. Moreover, because the amount of initial food intake was limited, all patients were determined to receive an infusion of 500 ml of an electrolyte solution. The type of infusion was chosen by the doctor based on the patient's condition.

3) **Time to Extubation of the Urinary Catheter** The urinary catheter was extubated in 91% of patients on the 1st postoperative day. After a team discussion, it was decided that the urinary catheter should be removed on the morning of the 1st postoperative day.

4) **Use of Antibiotics** Table 5 shows antibiotics administered to patients postoperatively. Injectable antibiotics were administered postoperatively to most patients for a few days beginning on the day

Table 1. Investigation of the Clinical Chart: Basic Data

| Items investigated                     |                              | Number of patients (n=57) | Items investigated                                      |                                     | Number of patients (n=57) |
|--|------------------------------|---------------------------|---|-------------------------------------|---------------------------|
| Diagnosis                              | ovarian cyst                 | 31                        | Time of leaving sick bed                                | on the day of surgery               | 1                         |
|  | endometriosis                | 19                        |   | on the next morning after surgery   | 46                        |
|  | infertility                  | 2                         |   | on the next afternoon after surgery | 10                        |
|  | others                       | 5                         | Fever (>38°C)   | absent                              | 39                        |
| Age                                    | below 20                     | 0                         |   | present                             | 18                        |
|  | between 21 and 30            | 24                        | Duration of fever (in 18 patients)                      | within 24 h after surgery           | 12                        |
|  | between 31 and 40            | 25                        |   | within 2 d after surgery            | 3                         |
|  | between 41 and 50            | 5                         |   | unknown                             | 3                         |
|  | over 50                      | 3                         | Use of antipyretics                                     | not used                            | 43                        |
| Surgical techniques                    | cystectomy                   | 39                        |   | used                                | 2                         |
|  | adhesiolysis                 | 9                         |   | used as an analgesic                | 2                         |
|  | salpingo-oophorectomy        | 4                         |   | unknown                             | 10                        |
|  | others                       | 5                         | Wound pain  | absent                              | 5                         |
| Operating time                         | between 30 and 60 min        | 11                        |   | present                             | 52                        |
|  | between 60 and 90 min        | 21                        | Duration of wound pain (in 52 patients with wound pain) | within 12 h after surgery           | 9                         |
|  | between 90 and 120 min       | 18                        |   | within 24 h after surgery           | 14                        |
|  | between 120 and 180 min      | 7                         |   | within 2 d after surgery            | 16                        |
|  | between 150 and 180 min      | 2                         |   | 3 d or more after surgery           | 5                         |
|  |                              | unknown                   |   | 8                                   |                           |
| Anesthetizing time                     | between 60 and 90 min        | 2                         | Use of analgesics (in 52 patients with wound pain)      | not used                            | 29                        |
|  | between 90 and 120 min       | 12                        |   | used                                | 22                        |
|  | between 120 and 150 min      | 16                        |   | unknown                             | 1                         |
|  | between 150 and 180 min      | 17                        | Nausea  | absent                              | 47                        |
|  | between 180 and 210 min      | 6                         |   | present                             | 10                        |
|  | more than 210 min            | 4                         | Duration of nausea (in 10 patients)                     | within 6 h after surgery            | 7                         |
| Blood loss                             | slight                       | 49                        |   | within 12 h after surgery           | 0                         |
|  | less than 100 mL             | 3                         |   | within 24 h after surgery           | 2                         |
|  | between 100 mL and 200 mL    | 2                         |   | within 2 d after surgery            | 1                         |
|  | between 200 mL and 300 mL    | 2                         | Vomiting  | absent                              | 51                        |
| between 300 mL and 400 mL              | 1                            | present                   |   | 4                                   |                           |
| more than 400 mL                       | 1                            | unknown                   |   | 2                                   |                           |
| Severity of adhesion                   | no adhesiolysis              | 37                        | Use of antiemetics                                      | not used                            | 44                        |
|  | adhesiolysis required        | 20                        |   | used                                | 5                         |
| Withdrawal of urethral catheterization | on the day of surgery        | 2                         |   | unknown                             | 8                         |
|  | on the next day of surgery   | 52                        |   |                                     |                           |
|  | 2 or more days after surgery | 2                         |   |                                     |                           |
|  | unknown                      | 1                         |   |                                     |                           |

of surgery. Subsequently, injectable antibiotics were changed to oral antibiotics, which were also administered for a few days. However, 2 patients were treated with injectable antibiotics alone without further administration of oral antibiotics.

Five different injectable antibiotics (5 types of cepheps) were used in our patients. Flomoxef was used most frequently (38%). The duration of treatment with injectable antibiotics ranged from 1 to 5 days (between the day of surgery and the 4th

postoperative day), but, for most patients, it was within 3 days.

Four different oral antibiotics were used: 3 types of cepheps and 1 type of tetracycline. Tetracycline was prescribed for only one patient to treat pimples as well as to prevent infection. Cefcapene pivoxil was used most frequently (in 54% of patients). The duration of the administration of oral antibiotics ranged from 0 to 8 days, but, in most patients (61%), it was 5 days.

Table 2. Investigation of the Clinical Chart: Detailed Days of Hospitalization and Surgery

| Hospitalization period | Patients admitted on Monday who underwent surgery on Tuesday (n=29) | Patients admitted on Wednesday who underwent surgery on Thursday (n=26) | Patients admitted on Wednesday who underwent surgery on Friday (n=2) | Total |
|------------------------|---|---|--|-------|
| 3 days                 | 0   | 2   | 0  | 2     |
| 4 days                 | 3   | 2   | 0  | 5     |
| 5 days                 | 9   | 17  | 1  | 27    |
| 6 days                 | 5   | 3   | 1  | 9     |
| 7 days                 | 7   | 1   | 0  | 8     |
| More than 7 days       | 5   | 1   | 0  | 6     |

Table 3. Investigation of the Clinical Chart: Details of Meals after Surgery

| Type of meals           | Patients in whom postoperative food intake was initiated from breakfast on the next day (n=33*) |       |        | Patients in whom postoperative food intake was initiated from lunch on the next day (n=23) |        |
|-------------------------|---|-------|--------|--|--------|
|                         | Breakfast   | Lunch | Supper | Lunch  | Supper |
| complete rice gruel     | 18  | 16    |        | 15   | 9      |
| 33%-complete rice gruel |   |       |        |  | 1      |
| Liquid food             |   |       |        | 1  |        |
| Ordinary food           | 14  | 16    | 32     | 7  | 13     |
| Unknown                 | 1   |       |        |  |        |

\* 2 patients were discharged: one before lunch and the other before supper.

Table 4. Investigation of the Clinical Chart: Amount of Food Intake

| Amount of food intake | Patients in whom postoperative food intake was initiated from breakfast on the next day (n=33*) |       |        | Patients in whom postoperative food intake was initiated from lunch on the next day (n=23) |        |
|-----------------------|---|-------|--------|--|--------|
|                       | Breakfast   | Lunch | Supper | Lunch  | Supper |
| Slight                | 3   | 1     | 2      | 2  |        |
| Less than 25%         | 12  | 5     | 4      | 2  | 1      |
| Between 25% and 50%   | 5   | 5     | 5      | 3  | 3      |
| Between 50% and 75%   | 8   | 13    | 9      | 6  | 5      |
| More than 75%         | 5   | 8     | 12     | 9  | 13     |
| Unknown               |   |       |        | 1  | 1      |

\* 2 patients were discharged: one before lunch and the other before supper.

These differences in the use of antibiotics were not associated with the severity of disease, but were due to differences in doctors' orders. The duration of postoperative administration of antibiotics should be as short as possible, however, sufficient evidence was not available about the appropriate duration of postoperative administration of antibiotics. Therefore, referring to the previous procedure, the team decided that injectable antibiotics should be administered until the 1st postoperative day, while oral antibiotics should be administered for 5 days, begin-

ning on the 2nd postoperative day. Currently, there is no evidence supporting the selection of any particular antibiotic. Therefore, the selection of the antibiotic was left to the doctors in charge.

##### 5) Method of Preoperative Bowel Preparation

In our department, preoperative bowel preparation used to be performed with an oral purgative (Magcorol®, 250 ml containing 34 g magnesium citrate) and 2 glycerin enemas (120 ml of 50% glycerin solution). However, most patients complained of pain during bowel preparation. Therefore, we performed a

Table 5. Investigation of the Clinical Chart: Use of Antibiotics

(n=57)

| Items investigated     |                     | Number of patients              |    |
|------------------------|---------------------|---------------------------------|----|
| Injectable antibiotics | Duration            | Only on the day of surgery      | 13 |
|                        |                     | Until the next day of surgery   | 18 |
|                        |                     | Until the 2nd postoperative day | 22 |
|                        |                     | Until the 3rd postoperative day | 3  |
|                        |                     | Until the 4th postoperative day | 1  |
|                        | Type of antibiotics | Cefazolin                       | 11 |
|                        |                     | Cefotiam                        | 12 |
|                        |                     | Cefoperazone                    | 9  |
|                        |                     | Cefmetazole                     | 4  |
|                        |                     | Flomoxef                        | 21 |
| Oral antibiotics       | Day of initiation   | The day of surgery              | 0  |
|                        |                     | 1st postoperative day           | 12 |
|                        |                     | 2nd postoperative day           | 25 |
|                        |                     | 3rd postoperative day           | 14 |
|                        |                     | 4th postoperative day           | 4  |
|                        |                     | Not prescribed                  | 2  |
|                        | Duration            | 3 days                          | 11 |
|                        |                     | 4 days                          | 6  |
|                        |                     | 5 days                          | 35 |
|                        |                     | 6 days                          | 0  |
|                        |                     | 7 days                          | 1  |
|                        |                     | More than 7 days                | 1  |
|                        |                     | Not prescribed                  | 2  |
| Type of antibiotics    | Cefaclor            | 6                               |    |
|                        | Cefteram            | 17                              |    |
|                        | Cefcapene           | 31                              |    |
|                        | Minocycline         | 1                               |    |
|                        | Not prescribed      | 2                               |    |

random controlled study<sup>8)</sup> to reduce patients' complaints, and the method was changed to 250 ml of Magcorol<sup>®</sup> and 10 drops of Laxoberone<sup>®</sup> solution (7.5 mg/ml sodium picosulfate solution) orally the day before surgery and a 120-ml glycerin enema in the early morning on the day of surgery.

**6) Criteria for Variances** Based on the results of an investigation of the clinical charts (Table 1), 32% of patients had fevers above 38°C postoperatively, but in 67% of these patients, the temperatures went down within 24 hours after surgery. Therefore, it was determined that a fever above 39°C on the day of surgery or a fever above 38°C after the 1st postoperative day should be regarded as abnormal.

Wound pain was noted in 91% of patients, but it was relieved in 89% of patients within 2 days (Table 1). Therefore, it was determined that wound pain

persisting for more than 3 days should be regarded as a variance. Since vomiting was generally relieved within 6 hours after surgery despite the presence of nausea, frequent vomiting was regarded as a variance. These variances are listed in Table 6.

When these variances were observed, the doctor was informed so that the patient could be treated appropriately. The clinical pathway was discontinued in patients with large variances.

## 2. Preparation and Application of the Clinical Pathway

Using the above issues, we prepared a draft of the clinical pathway. The details of each draft were carefully examined by the medical staff members in the respective divisions, and revised several times to obtain the final version of the clinical pathway for medical staff members (Fig. 1).

Table 6. Criteria for Variances which Require the Doctor's Direction

| Items                   |                       | Values recognized as variances                                |
|-------------------------|-----------------------|---|
| Body temperature        | On the day of surgery | 39°C or more  |
|                         | 1st postoperative day | 38°C or more  |
|                         | 2nd postoperative day | 38°C or more  |
| Pulse                   |                       | 100 beats/minutes or more                                     |
| Blood pressure          | systolic              | 80 mmHg and below or 160 mmHg and over                        |
|                         | diastolic             | 40 mmHg and below or 90 mmHg and over                         |
| SPO <sub>2</sub>        |                       | 95% or below  |
| Urine volume            |                       | 100 mL or below in 6 hours                                    |
| Bleeding from the wound |                       | Hemorrhage leaking through the adhesive wound dressing.       |
| Wound pain              |                       | When wound pain persisted for more than 3 days after surgery. |
| Vomiting                |                       | Frequent  |

A leaflet was also prepared to explain the clinical pathway to patients. Furthermore, the preliminary prescriptions for injections and the slips for doctor's orders used during the hospitalization were preprinted. Previously, the details of treatment were reported to the medical accounting section every day. However, only the application of the clinical pathway was to be reported upon admission when it was determined that the clinical pathway should be applied to a patient. Therefore, it was not necessary to report items printed on the clinical pathway to the medical accounting section except for an alteration of items to be checked or the discontinuation of treatment according to the clinical pathway.

The style of the pharmacist's record of instructions to patients on drug management (Fig. 2) and the nursing record were changed. Specifically, the pharmacist's record was simplified to the form with the items to be checked, which included the presence or absence of contraindicated drugs, side effects and drug interactions, and the principle contents of instructions to patients on dosage and administration. With these changes, the time required to create a patient record was greatly decreased, which allowed sufficient time to be spent on instructing patients about dosage and administration.

When a patient was admitted to hospital, an attending nurse was in charge of distributing the leaflet and explaining the clinical pathway to each patient, while a pharmacist collected the patient's information and gave initial instructions to the patient on drug administration.

### 3. Evaluation of the Clinical Pathway

The clinical pathway was applied to a small num-

ber of patients undergoing laparoscopic surgery in a pilot study and evaluated by the team that created it. It proved to be practically applicable to all patients undergoing laparoscopic surgery. The usefulness of the introduction of the clinical pathway was also confirmed by the results of a questionnaire from 14 patients to whom the clinical pathway was applied (Fig. 3). No case of variance from the pathway was observed among the patients. Eighty-six percent of patients replied that they understood the treatment sufficiently and they were at ease during hospitalization. All patients replied that they were quite satisfied or somewhat satisfied with hospital treatment. These results indicate that most patients accepted the clinical pathway.

### DISCUSSION

The result of an investigation of the clinical charts revealed that, before the introduction of the clinical pathways, the treatment and care processes, such as time to initiation of postoperative food intake, type of meals, and the time to extubation of the urinary catheter, varied from doctor to doctor. Therefore, it was bothersome to have to confirm the doctor's orders for each patient. After the introduction of the clinical pathway, these criteria were unified, thus decreasing the time required to confirm the doctor's orders and allowing for the efficient performance of medical services. Moreover, careless omissions of orders and confirmations were eliminated because all medical services were listed on the clinical pathway. In particular, the determination of criteria for variances (data deviating from the standard values on the clinical pathway) was useful in practic-

|                            | On the day of surgery  |  |  |   |
|----------------------------|--|--|--|---|
|                            | Between admission and the day before surgery   | Before surgery   | After surgery  |   |
|                            | <ul style="list-style-type: none"> <li>Clinical survey on admission to the hospital</li> <li>Booking of anesthesia</li> <li>Informed consent for surgery</li> <li>Explanation of hospitalization plan</li> <li>Order of pharmaceutical care by pharmacists</li> <li>Anesthesiological examinations</li> <li>Informed consent for anesthesia</li> <li>Examinations of respiratory function</li> <li>Inspection of allergy tests against antibiotics (intradermal reactions)</li> <li>Attachment of name band (name and age written by a patient oneself)</li> </ul>   |  |  |   |
| Treatment and examinations |  |  |  |   |
| Drugs                      | <ul style="list-style-type: none"> <li>Check drugs that the patient brought</li> <li>Orally administer Magcorol at 14:00.</li> <li>Orally administer 10 drops of Laxobroner at 20:00.</li> <li>Orally administer 1 tablet of Rowson at 21:00.</li> </ul>   | <ul style="list-style-type: none"> <li>Perform glycerin enema at 6:00.</li> <li>Perform preoperative drip infusion (in case of on call).</li> <li>Perform premedication with a sedative as instructed by an anesthesiologist.</li> </ul>   | <ul style="list-style-type: none"> <li>Perform postoperative drip infusion (500 ml × 4).</li> <li>Perform postoperative drip infusion of antibiotics (after returning to the sickroom and at night).</li> <li>Give no food or water to the patient.</li> </ul>   | <ul style="list-style-type: none"> <li>Perform postoperative drip infusion (500 ml × 1).</li> <li>Perform postoperative drip infusion of antibiotics (at morning and evening).</li> </ul>   |
| Drugs                      |  |  |  |   |
| Foods                      | <ul style="list-style-type: none"> <li>Serve the patient ordinary foods.</li> <li>Fast the patient after supper.</li> <li>Give no foods and water to the patient after 21:00.</li> </ul>   | <ul style="list-style-type: none"> <li>Give no food or water to the patient.</li> </ul>  | <ul style="list-style-type: none"> <li>Serve ordinary foods to the patient.</li> </ul>   |   |
| Foods                      |  |  |  |   |
| Rest                       | <ul style="list-style-type: none"> <li>There is no restriction.</li> </ul>   | <ul style="list-style-type: none"> <li>Rest the patient on the bed except for excretion.</li> <li>Use a strider when the patient leaves the sickroom.</li> <li>Alter performing enema at 6:00, change the patient's cloth to a bathrobe-type hospital gown.</li> <li>Remove false teeth, glasses and accessories.</li> <li>Check urination.</li> <li>Check the gauge of a needle for drip infusion.</li> <li>Check the remaining drip infusion.</li> <li>Do not allow the patient to bathe.</li> </ul> | <ul style="list-style-type: none"> <li>Let the patient rest on the bed.</li> <li>Allow the patient to change positions on the bed.</li> <li>Manage infusion (adjust the speed of the drip infusion so the infusion lasts until 9:00 the next morning).</li> <li>Manage the urinary catheter.</li> <li>Recommend that the patient gargle.</li> </ul>  | <ul style="list-style-type: none"> <li>Allow the patient to start walking.</li> <li>Support the patient to take the sitting position in the morning and to start walking during the morning.</li> <li>Reubate the urinary catheter during the morning.</li> <li>Sponge the patient's body.</li> </ul> |
| Rest                       |  |  |  |   |
| Care                       | <ul style="list-style-type: none"> <li>Preparation of personal belongings required on admission (a name plate, hospital gown, a thermometer and a chart to record the frequency of excretion)</li> <li>Orientation on admission</li> <li>Preoperative orientation (bathrobe-type hospital gowns, a T-hand or a free panty and a bagfull of M-pads)</li> <li>Umbilical treatment (clean with olive oil)</li> <li>Rub the patient.</li> <li>Trim nails and remove nail varnish.</li> </ul>   |  |  |   |
| Care                       |  |  |  |   |
| Cleanliness                | <ul style="list-style-type: none"> <li>Explanation of the treatment by the attending physician (informed consent, course of treatment, probable risks during the course, complications and side effects)</li> <li>Explanation by an anesthesiologist (explanation of basic anesthesia, methods of anesthesia and the process of surgery)</li> <li>Explanation of drugs by a pharmacist (explanation of drugs to be used during hospitalization)</li> <li>Explanation by nurses (preparation of treatment, course of treatment, predicted symptoms and method of treatment)</li> </ul>  |  |  |   |
| Cleanliness                |  |  |  |   |
| Education and instructions | <ul style="list-style-type: none"> <li>Check on admission and at 19:00.</li> </ul>   | <ul style="list-style-type: none"> <li>Check at 6:00, before premedication and after premedication.</li> </ul>   | <ul style="list-style-type: none"> <li>Check immediately after returning to the sickroom, and 50 and 60 minutes later.</li> <li>Also, check at 11:00, 14:00, 19:00, and 21:00.</li> <li>Wound observation: check exudate, blood loss and upper contamination.</li> <li>Pain observation: check wound pain, shoulder pain and hypochondrial pain.</li> <li>Abdominal observation: check gas excretion, abdominal distension and peristaltic sounds</li> <li>Vaginal observation: check blood loss and characteristics.</li> <li>Urinary conditions: check spontaneous urination, urine volume, characteristics, pain on urination and feeling of residual urine (after emptying the urinary catheter).</li> </ul> | <ul style="list-style-type: none"> <li>Instruct the patient about the importance of cleanliness</li> <li>Instruct the patient about the necessity for the development of ADL.</li> </ul>  |
| Education and instructions |  |  |  |   |
| Vital signs                | <ul style="list-style-type: none"> <li>Details of treatment should be additionally explained to the patient proactively according to the level of the patient's understanding after confirming the details of previous explanation by the attending physician.</li> <li>Design a nursing plan.</li> <li>Input the fasting program.</li> <li>Check a chart to record the delivery of the patient to the operating room (check the removal of false teeth and post gowns and final wear index).</li> <li>Check equipment required in the operating room (a clinical chart, a thermometer, X-P, a bathrobe-type hospital gown, a bagfull of M-pads and a T-hand or a free panty)</li> <li>Confirm the attachment of a name band.</li> </ul> | <ul style="list-style-type: none"> <li>Check at 6:00, 11:00, 14:00, and 19:00.</li> </ul>  | <ul style="list-style-type: none"> <li>Check at 6:00, 11:00, 14:00, and 19:00.</li> </ul>  |   |
| Vital signs                |  |  |  |   |
| Points of nursing          |  |  |  |   |
| Points of nursing          |  |  |  |   |

Fig. 1. Clinical Pathway for Medical Staff Members

|  |   |
|--|---|
| / (Date of admission)  |   |
| <b>Instruction on dosage and administration on admission</b>   |   |
| <input type="checkbox"/> History of adverse reactions and allergies<br>antibiotics (- · +) egg (- · +) atopy (- · +) pollen allergy (- · +) others (- · +) |   |
| <input type="checkbox"/> Prescription (- · +)  |   |
| <input type="checkbox"/> Medications · OTC · health foods (- · +)  |   |
| <input type="checkbox"/> General statements on drugs used during hospitalization based on package inserts  |   |
| <b>Instruction on dosage and administration</b>  |   |
| Magcorol :   |   |
| <input type="checkbox"/> Explanation of medication and therapeutic value   | <input type="checkbox"/> Method of medication   |
| <input type="checkbox"/> Purpose of medication and therapeutic value   | <input type="checkbox"/> Symptoms after medication  |
| <input type="checkbox"/> Time of medication  | <input type="checkbox"/> Side effects (abdominal distention, abdominal pain, nausea, lightheadedness, etc.) |
| <input type="checkbox"/> Side effects (abdominal distention, abdominal pain, nausea, lightheadedness, etc.)  | <input type="checkbox"/> Others   |
| Laxoberone :   |   |
| <input type="checkbox"/> Purpose of medication and therapeutic value   | <input type="checkbox"/> Method of medication   |
| <input type="checkbox"/> Side effects (abdominal pain, borborygmus, nausea, etc.)  | <input type="checkbox"/> Time of medication   |
| <input type="checkbox"/> Side effects (abdominal pain, borborygmus, nausea, etc.)  | <input type="checkbox"/> Others   |
| Glycerin enema :   |   |
| <input type="checkbox"/> Purpose and therapeutic value   | <input type="checkbox"/> Side effects (abdominal distention, abdominal pain, lightheadedness, etc.)         |
| <input type="checkbox"/> Side effects (abdominal distention, abdominal pain, lightheadedness, etc.)  | <input type="checkbox"/> Others   |
| <input type="checkbox"/> Explanation of postoperative electrolyte injection  |   |
| <input type="checkbox"/> Purpose   | <input type="checkbox"/> Duration   |
| <input type="checkbox"/> Side effects  |   |
| <input type="checkbox"/> Explanation of postoperative antibiotic injection   |   |
| <input type="checkbox"/> Purpose   | <input type="checkbox"/> Duration   |
| <input type="checkbox"/> Side effects (Allergic symptoms)  |   |
| <input type="checkbox"/> Treatment (Rapidly inform physicians and nurses when dyspnea or urticaria is noted)   |   |
| <input type="checkbox"/> It should be explained to the patient that postoperative wound pain and nausea can be controlled by necessary medication.         | Pharmacist :  |
| <b>Items to be checked</b>   |   |
| <Contraindication>   |   |
| <b>Past history</b>  |   |
| <input type="checkbox"/> Prolonged constipation or abdominal pain (- · +)  | <input type="checkbox"/> Hemorrhoid (- · +)   |
| <input type="checkbox"/> Heart diseases (- · +)  | <input type="checkbox"/> Hypertension (- · +)   |
| <input type="checkbox"/> Narrow-angle glaucoma (- · +)   | <input type="checkbox"/> Peptic ulcer (- · +)   |
| <input type="checkbox"/> Asthma (- · +)  | <input type="checkbox"/> Addison disease (- · +)  |
| <input type="checkbox"/> Porphyria (- · +)   | <input type="checkbox"/> Renal diseases (- · +)   |
| <input type="checkbox"/> Pregnancy or a possibility of pregnancy (- · +)   |   |
| <b>Clinical laboratory data</b>  |   |
| <input type="checkbox"/> Liver function (Bil, TP, Alb, TTT, GOT, GPT, ALP, $\gamma$ -GTP, LDH, HBs antigen) (Abnormality : - · +)                          |   |
| <input type="checkbox"/> Renal function (Scr, BUN, urine volume) (Abnormality : - · +)   |   |
| <input type="checkbox"/> Hematological data (WBC, RBC, Ht, Hb) (Abnormality : - · +)   |   |
| <b>Concomitant drugs</b>   |   |
| <input type="checkbox"/> HIV protease inhibitors, HIV reverse transcriptase inhibitors (- · +)   |   |
| <Others>   |   |
| <input type="checkbox"/> Antibiotics ( )   | Intradermal reaction : (+ · -)  |
| <input type="checkbox"/> Check of interactions between brought-in drugs and scheduled drugs  |   |
| <input type="checkbox"/> Check of double administration of brought-in drugs and scheduled drugs  | Pharmacist :  |

|   |   |
|---|---|
| / (Initiation of medication)  |   |
| <b>Check the following items to which postoperative electrolyte injection is contraindicated</b>  |   |
| <input type="checkbox"/> Constipation, severe abdominal pain, nausea, abdominal distention, hard stool (Abnormality : - · +)                                      |   |
| <input type="checkbox"/> Lactic acidosis (dyspnea, abdominal pain, nausea, disturbance of consciousness) (Abnormality : - · +)                                    |   |
| <input type="checkbox"/> Serum K levels, tetraplasia, lack of strength, muscular weakness, disturbance of consciousness, arrhythmia (Abnormality : - · + no data) |   |
| <input type="checkbox"/> Urine volume (Abnormality : - · + no data)   |   |
| <input type="checkbox"/> BUN (>25 mg/dL; abnormal levels) (Abnormality : - · + no data)   |   |
| <b>Check postoperative adverse reactions induced by antibiotics</b>   |   |
| <input type="checkbox"/> Shock or anaphylactic symptoms (Abnormality : - · +)   |   |
| <input type="checkbox"/> Hematological disorders (Abnormality : - · +)  |   |
| <input type="checkbox"/> Liver dysfunction (Abnormality : - · +)  |   |
| <input type="checkbox"/> Renal dysfunction (Abnormality : - · +)  |   |
| <input type="checkbox"/> Pseudomembranous colitis (Abnormality : - · +)   |   |
| <input type="checkbox"/> Toxic epidermal necrosis, mucocutaneous ocular syndrome (Abnormality : - · +)  |   |
| <input type="checkbox"/> Interstitial pneumonia, PIF syndrome (Abnormality : - · +)   |   |
| <input type="checkbox"/> Spasms (Abnormality : - · +)   |   |
|   | Pharmacist :  |
| <b>Instruction on dosage and administration</b>   |   |
| / )   |   |
| <input type="checkbox"/> Explanation of postoperative medication  |   |
| <input type="checkbox"/> Purpose of medication and therapeutic value  |   |
| <input type="checkbox"/> Method of medication   |   |
| <input type="checkbox"/> Duration of medication   |   |
| <input type="checkbox"/> Side effects (Allergic symptoms)   |   |
| <input type="checkbox"/> Explanation based on the explanatory for patients  |   |
| <input type="checkbox"/> Evaluation of compliance   |   |
| <input type="checkbox"/> Confirmation of contraindicative drugs   |   |
| <input type="checkbox"/> Confirmation of interactions   |   |
| <input type="checkbox"/> Confirmation of double medication  |   |
| <input type="checkbox"/> Confirmation of side effects   | Pharmacist :  |
| <b>Instruction on dosage and administration on discharge</b> (Date : ) (Pharmacist : )  |   |
| <Prescriptions on discharge >   |   |
| Person to whom instructed   | <input type="checkbox"/> Patient oneself <input type="checkbox"/> Family members · Others ( ) |
| <input type="checkbox"/> Administration and dosage  | <input type="checkbox"/> Therapeutic value  |
| <input type="checkbox"/> Side effects   | <input type="checkbox"/> Duration of medication   |
| <input type="checkbox"/> Drug interactions  | <input type="checkbox"/> Method of storage  |
| <input type="checkbox"/> In cases of skipping medication  | <input type="checkbox"/> Importance of patient compliance                                     |
| <input type="checkbox"/> Others   |   |
| Other contents were kept on record in the another sheet.  |   |

Fig. 2. Record of Instructions to Patients on Drug Management by Pharmacists



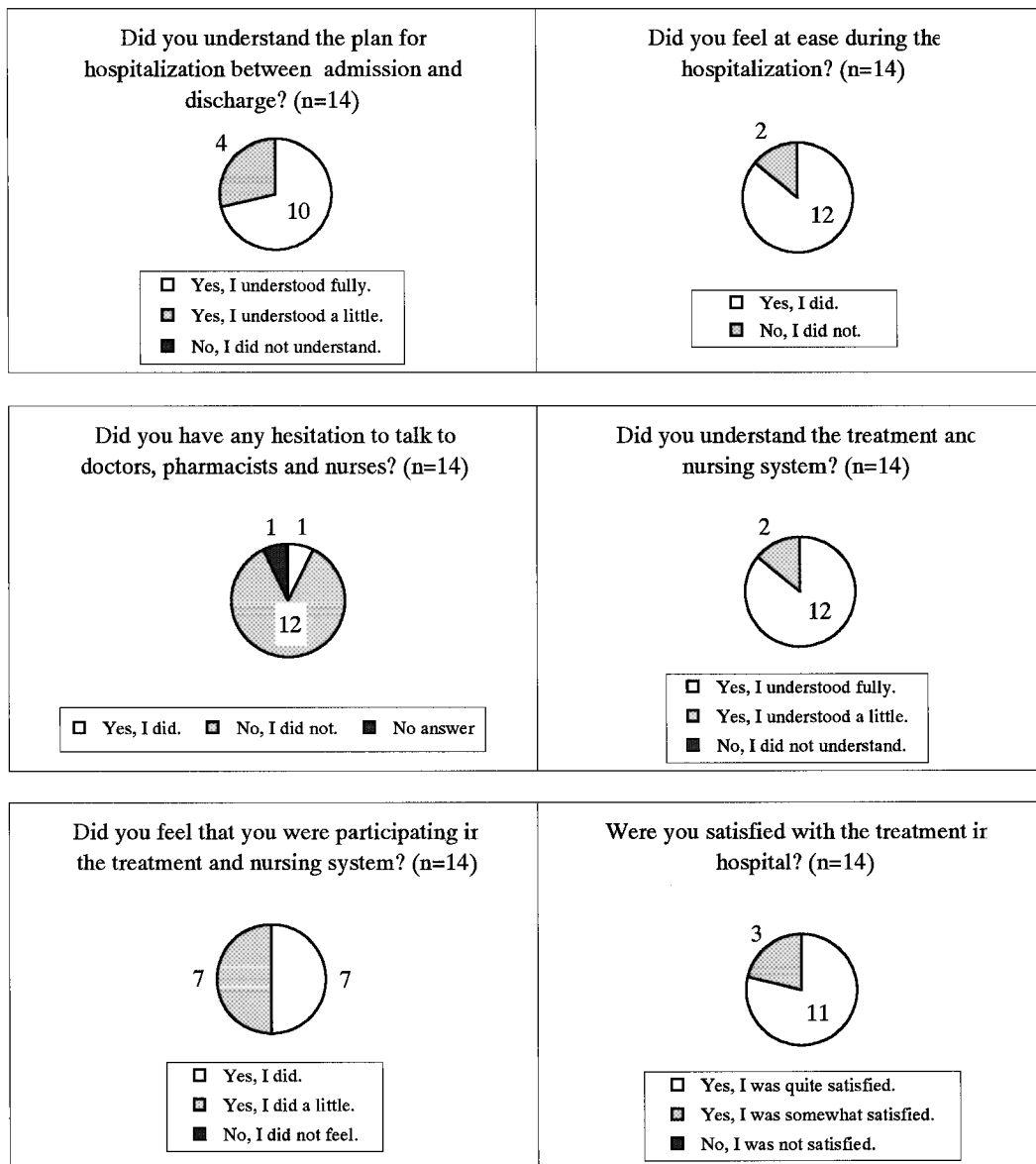


Fig. 3. Results of a Questionnaire in the Patients to whom the Clinical Pathway was Applied

ing unified care for patients.

The clinical pathway determined the drugs to be used and the time of medication, so that details and time of instructions to patients on dosage and administration were standardized, which resulted in efficient pharmaceutical care.

In the present study, the clinical pathway was established by a medical team based on the results of the investigation of the clinical charts after reevaluating our previous care processes for patients undergoing laparoscopic surgery. These processes may have contributed to unification of medical awareness among medical staff members from different specialties or even from the same sections. The participation

of all medical staff members was essential to the evaluation of care processes, and it was considered that mutual understanding through the exchange of opinions among medical staff members from various specialties made it possible to establish a practically useful clinical pathway and also led to the practice of more accurate team medical service.

A leaflet for patients that described the clinical pathway was distributed and explained to each patient by an attending nurse. This helped to alleviate patient anxiety about hospital treatment and to improve awareness about the treatment, which resulted in a satisfactory hospitalization. Thus, it was confirmed that the clinical pathway was useful for both

medical staff members and patients.

In the future, we would like to improve the current clinical pathway by evaluating more items than we examined in this study. In particular, because of the absence of sufficient evidence about which antibiotic to use, the selection of antibiotics was entrusted to each individual doctor, although the administration period was pre-set. Very few studies have evaluated the detailed method of antibiotic administration in patients undergoing laparoscopic surgery in obstetrics and gynecology. Along with the present study, we revised the method of preoperative bowel preparation in patients undergoing laparoscopic surgery based on the results of a randomized controlled study that we conducted.<sup>8)</sup> These types of studies are also necessary for the proper use of antibiotics in the clinical pathway. In particular, the evaluation of the necessity for prophylactic use of antibiotics, the improvement of the method of administration, the selection of the most appropriate antibiotics, and the duration of administration should be investigated.

In summary, we confirmed that the participation of all medical staff was important for the establishment of a practically useful clinical pathway, and the introduction of a clinical pathway allowed for more

efficient and accurate team medical service. In particular, the participation of pharmacists on the medical team was essential because the use of drugs and pharmaceutical care are such an important part of patient care. Clinical pathways need to be improved even after introduction to clinical cases by reviewing periodically by a medical team.

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