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CLINICAL ARTICLE

Analysis of hysterectomies for patients with uterine leiomyomas in China in 2010

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ABSTRACT

Objective: To analyze surgical methods and medical costs for patients with uterine leiomyomas treated by hysterectomy in mainland China in 2010. *Methods:* In a cross-sectional study, data for patients hospitalized with uterine leiomyomas and treated with hysterectomy were obtained from pooled medical records of 3030 hospitals. Type of surgery was categorized into abdominal hysterectomy (AH), laparoscopic hysterectomy (LH), and total vaginal hysterectomy (TVH). Length of stay and medical costs were analyzed for each procedure and in four types of hospital. *Results:* Among 147 966 patients, 129 668 (87.6%) underwent AH, 9164 (6.2%) LH, and 9134 (6.2%) TVH. The total cost and operative cost were lowest for the AH group and highest for the LH group ($P < 0.001$). Length of stay was shortest for TVH groups in all four types of hospital ($P < 0.001$). The ratios between the frequencies of the three procedures were significantly different among the four types of hospital ($P < 0.001$). *Conclusion:* In mainland China, AH remains the main surgical route of hysterectomy for patients with uterine leiomyomas. The length of stay was shortest among patients undergoing TVH, but the mean stay was still more than 9 days.

1. Introduction

Among gynecologic diseases, uterine leiomyomas are the most common benign tumors [1]. Hysterectomy is one of the mainstays of therapy, especially for patients who are older and have no reproductive plans. In the USA, approximately 40% of all hysterectomies are done as a result of uterine leiomyomas, making these tumors the most common indication for this procedure [2]. There are main three surgical routes for hysterectomy: abdominal, laparoscopic, and vaginal. Abdominal hysterectomy (AH) is the classic approach, and is now the last resort when other surgical routes have failed. Total vaginal hysterectomy (TVH) and laparoscopic hysterectomy (LH) are classified as minimally invasive procedures (MIPs).

TVH was first performed for patients with uterine prolapse, and was then gradually applied to other gynecologic diseases. Patients undergoing this surgery experience fewer complications, have shorter inpatient stays and recovery time, are associated with less expense, and have a better quality of life than do those undergoing AH [3]. In LH, all or some of the operative procedures are done by laparoscopy [4]. LH requires more skilled techniques and specific surgical instruments than do AH and TVH. However, the main advantage of LH is that it facilitates inspection of, and operation on, other pelvic organs in addition to the uterus, particularly in operations on adnexa uteri and the decomposition of adhesions, and it ensures satisfactory hemostasis under the direct vision of the laparoscope before completion of surgery [5].

In mainland China, more than 100 000 women undergo hysterectomy for leiomyomas every year. As a result, the aim of the present study was to analyze the surgical methods used and medical costs for these patients by analyzing medical records from 2010.

2. Materials and methods

The present cross-sectional study was based on a retrospective review of data obtained from medicals records pooled by the Chinese Ministry of Health for patients hospitalized with uterine leiomyomas and treated with hysterectomy in mainland China between January 1 and December 31, 2010. Military hospitals do not submit data to the Ministry of Health, so these centers were not included. Data were obtained for 3030 hospitals nationwide. The study was exempt from informed medical consent requirements and approved by the Review Broad at Peking Union Medical College Hospital, Beijing, China.

Diagnosis of uterine leiomyomas was restricted to disease D25 of the International Classification of Diseases, 10th Revision. Surgery was classified as 68.3 and 68.39 (both representing subtotal AH), 68.31 (supracervical LH), 68.4 and 68.49 (both representing total AH), 68.41

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(total LH), 68.5 and 68.59 (both representing TVH), and 68.51 (laparoscopic-assisted vaginal hysterectomy), in accordance with the International Classification of Diseases, 9th Revision, Clinical Modification 3.

According to the classification system of Chinese medical institutions, the hospitals were classified as general hospitals (n = 2281), gynecology and obstetrics hospitals (n = 41), tumor hospitals (n = 31), and other hospitals (n = 677). The type of surgery was categorized into three groups according to the surgical route: AH (including total AH and subtotal AH), LH (including supracervical LH and laparoscopic-assisted vaginal hysterectomy), and TVH. Data on the surgical constituent ratio, patient age, length of hospital stay, total cost, operative cost, and operative cost as a proportion of total cost were extracted from the pooled medical records.

Data analyses were carried out with SPSS version 19.0 (IBM, Armonk, NY, USA). Data on length of stay, total cost, operative cost, and operative cost as a proportion of total cost in different surgical groups were processed by logarithm transformation and analyzed by analysis of variance because they did not fit a normal distribution. Surgical constituent ratios were analyzed by χ^2 test. All data were compared first as a whole population, and then between any two groups if the population showed significant differences. $P < 0.05$ was considered to be statistically significant.

3. Results

During the study period, 147 966 patients with leiomyomas were hospitalized and treated by hysterectomy in mainland China. The mean age of the patients was 46.25 ± 5.86 years. The mean length of hospital stay was 10.53 ± 5.59 days, the mean total cost was 7279 ± 3660, and the mean operative cost was 1641 ± 1047.

Of the 147 966 patients, AH was performed on 129 668 (87.6%), LH on 9164 (6.2%), and TVH on 9134 (6.2%). The basic information from these procedures is given in Table 1. The mean length of stay, total cost, operative cost, and operative cost as a proportion of total cost were significantly different among the three groups when compared as a population ($P < 0.001$ for all). Further comparison between pairs of groups indicated that the mean length of stay was significantly shorter after TVH than after AH ($P < 0.001$) or LH ($P < 0.001$). The mean length of stay was not significantly different between AH and LH ($P = 0.10$). The mean total cost and operative cost were both lowest for AH and highest for LH, and the difference between any two groups was significant ($P < 0.001$). The proportion of operative cost in total cost was lowest for AH and highest for TVH, and again the difference between any two groups was significant ($P < 0.001$).

The constituent ratio of the three surgical routes was analyzed in the different types of hospital. There were 126 519 cases in general hospitals, of which AH accounted for 111 884 (88.4%), LH for 7081 (5.6%), and TVH for 7554 (6.0%). Of the 7433 surgeries done in gynecology and obstetrics hospitals, AH accounted for 5026 (67.6%), LH for 1326 (17.8%), and TVH for 1081 (14.5%). The total number of cases in tumor hospitals was 1861, of which AH accounted for 1575 (84.6%), LH for 175 (9.4%), and TVH for 111 (6.0%). In other hospitals, there were 12 153 cases, of which AH accounted for 11 183 (92.0%), LH for 582 (4.8%), and TVH for 388 (3.2%). The surgical constituent ratios among the four hospital groups were significantly different when compared as a population ($P < 0.001$), and when compared between any two groups ($P < 0.001$).

The basic information for hysterectomy procedures in the different types of hospital is listed in Tables 2–5. When compared as a population, the mean length of stay, total cost, operative cost, and proportion of operative cost were significantly different among different surgical routes in the four types of hospital ($P < 0.001$).

4. Discussion

The present study has shown that AH was the most frequently chosen hysterectomy procedure for women with uterine leiomyomas in mainland China in 2010. Costs were significantly decreased with AH. However, length of hospital stay was the shortest after TVH. Considerable disparities were found in the frequencies of the three surgical routes in different types of hospital, with LH and TVH (MIPs) done most often in gynecology and obstetrics hospitals.

The data for the present study were obtained from the medical records of hospitals in mainland China that were pooled by the Ministry of Health. These medical records included relevant information for patients admitted nationwide; as a result, the study is representative of the general situation of hysterectomy procedures for patients with leiomyomas in mainland China in 2010.

In the present study, LH and TVH each accounted for only 6% of procedures. The relative proportions of AH, LH, and TVH were different across the four types of hospital. Several factors could influence the choice of surgical route of hysterectomy, including the size and the shape of the vagina and uterus, accessibility to the uterus, the extent

Table 1
Basic information from all hysterectomy procedures for leiomyomas.[a]

Information	Abdominal hysterectomy (n = 129 668)	Laparoscopic hysterectomy (n = 9164)	Total vaginal hysterectomy (n = 9134)
Mean length of stay, d	10.60 ± 5.75	10.51 ± 4.18	9.56 ± 4.20[b]
Mean total cost, ¥	7370 ± 3551[b]	10 064 ± 3947[b]	8014 ± 3641[b]
Mean operative cost, ¥	1539 ± 920[b]	2554 ± 1497[b]	2164 ± 1498[b]
Operative cost/total cost, %	23.0 ± 11.0[b]	25.9 ± 11.8[b]	27.0 ± 12.8[b]

[a] Values are given as mean ± SD.
[b] Significantly different from other two groups ($P < 0.001$ for both comparisons).

Table 2
Basic information from hysterectomy procedures for leiomyomas in general hospitals.[a]

Information	Abdominal hysterectomy (n = 111 884)	Laparoscopic hysterectomy (n = 7081)	Total vaginal hysterectomy (n = 7554)
Mean length of stay, d	10.62 ± 5.81[b]	10.42 ± 4.21[b]	9.72 ± 4.36[b]
Mean total cost, ¥	7031 ± 3527[b]	9878 ± 3969[b]	7612 ± 3360[b]
Mean operative cost, ¥	1529 ± 903[b]	2619 ± 1609[b]	1986 ± 1312[b]
Operative cost/total cost, %	22.9 ± 11.0[b]	26.7 ± 12.3[b]	26.4 ± 12.8[b]

[a] Values are given as mean ± SD.
[b] Significantly different from other two groups ($P < 0.001$ for both comparisons).