SUPRACERVICAL AND TOTAL ABDOMINAL HYSTERECTOMY TRENDS IN NEW YORK STATE: 1990–1996

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ABSTRACT To describe practice trends for total abdominal hysterectomy (TAH) and supracervical abdominal hysterectomy (SCH) in New York State and to identify fiscal features associated with these two operations, all inpatient discharges for TAH and SCH performed for benign indications from 1990 to 1996 were reviewed using the Statewide Planning and Resource Cooperative System, a centralized data reporting system. For each year examined, the number of TAHs and SCHs performed, the procedure rates adjusted for the total New York State female population, and the *per diem* charge (calculated from mean institutional charge as a function of average length of stay) were evaluated. While the TAH rate declined in New York State, from 34.0 in 1990 to 28.4 in 1996 ($P = .01$), the SCH rate increased nearly five-fold during the same period, from 0.62 to 3.07 ($P = .0003$). Patients tended to be discharged later following SCH than for TAH, although by 1996, the LOS for both operations was equivalent. The *per diem* institutional charge for SCH was consistently higher than for TAH in each year studied. The changes in charge and relative frequency of TAH and SCH in New York State invite further study to describe these trends more fully.

KEY WORDS Hysterectomy, Supracervical trends, Surgical practice.

INTRODUCTION

Some 30,000 women in New York State have a hysterectomy each year, representing an important component of health care resource consumption for the state.

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Although the number of these operations is large, as in the rest of the country,[1,2] New York State has seen fewer hysterectomies performed over the past decade. Interestingly, as the overall number of hysterectomies performed has declined, the supracervical abdominal hysterectomy (SCH) and total abdominal hysterectomy (TAH) rates have diverged. This study sought to describe the changing nature of hysterectomy practice in New York and to assess the economic impact corresponding to these changes.

MATERIALS AND METHODS

The number of TAHs and SCHs performed each year in New York State was calculated by computer-assisted analysis of the Statewide Planning and Resource Cooperative System database, maintained by the New York State Department of Health, Bureau of Biometrics. *Hysterectomy* was defined as the presence of an International Classification of Diseases (ICD-9 CM) procedure code of 68.3 (SCH) or 68.4 (TAH) in the discharge record.

The database used in this study is the most comprehensive collection of inpatient discharge information in New York State. It includes some 2.5 million records for each year reviewed. All discharges corresponding to SCH and TAH (assigned as the principal procedure) were extracted from this data set for analysis. Mean length of stay (LOS) and mean total institutional charge information for both procedures also were tabulated from this database. *Per diem* hospital charges for both procedures were calculated by dividing the average institutional charge by the LOS, as appropriate.

Rates of each operation were defined as the number of cases per 10,000 females in each year studied, as defined by New York State population estimates of the US Census Bureau.[3] Hysterectomy data were stratified by four diagnostic groups: malignant neoplasm (ICD-9 179-184), genital disorders (ICD 9 614-627), benign neoplasm (ICD-9 218-221), and "all others." For this investigation, only those uncomplicated discharges classified as genital disorders or benign neoplasm were included for review (i.e., any hysterectomies for malignancy were excluded). TAH and SCH were evaluated without regard to ovarian conservation or excision at the time of hysterectomy. Trends in radical, vaginal, or laparoscopic assisted hysterectomy were not measured in this study.

Institutional charges were adjusted for inflation using the corresponding annual consumer price index (CPI)[4] for 1990 and 1996. Changes in procedure rate

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and charge data were evaluated by computer-assisted regression analysis (Excel 7.0/Microsoft, Redmond, WA), and statistical significance was calculated by the least-squares regression line method. Slope characteristics were determined by a two-sided statistical hypothesis test of regression coefficients. A P value less than .05 was considered significant.

RESULTS

This study reviewed over 17 million hospital discharges in New York from 1990 to 1996. During this period, the frequency of TAH decreased, while the frequency of SCH increased (Tables I and II). For TAH, the decrease from a rate of 34.0 cases per 10,000 in 1991 to 28.4 in 1994 was significant ($P = .01$). Similarly, the increase in SCH rate from 0.62 to 3.07 during the same interval was highly significant ($P = .0003$).

Inflation caused most goods and services to be approximately 20% more expensive in 1996 than in 1990, according to CPI indices. Based on this formula, the mean hospital charge for TAH of $7,543 in 1990 was projected at $9,052 in 1996. The actual mean institutional charge for TAH in 1996 was well below this estimate; it had increased by only $87 by 1996, despite inflation. This difference was not significant ($P = .22$). For TAH, the pattern of hospital charges during the study interval was erratic. For example, the second year of the study showed

TABLE I Selected Characteristics of Supracervical (Abdominal) Hysterectomy in New York State, 1990–1996

	Cases*	Rate†	LOS, Days‡	Average Charge, $§	Charge/Day, ‖
1990	560	0.62	7.5	8,963	1,423
1991	655	0.73	7.0	8,897	1,271
1992	932	1.03	7.1	8,978	1,265
1993	1,144	1.26	6.1	9,391	1,540
1994	1,641	1.81	5.5	9,035	1,643
1995	2,142	2.36	5.1	9,149	1,794
1996	2,783	3.07¶	4.5	8,736#	1,941

*Procedure activity as estimated by the Statewide Planning and Resource Cooperative System (SPARCS) database, New York State Department of Health, Bureau of Biometrics.

†Number of cases performed/10,000 females.

‡Mean length of stay (LOS) (days).

§Mean institutional charge for operation (excludes physician's fee; not adjusted for inflation).

‖Average institutional charge/LOS (unadjusted).

¶0.62 vs. 3.07, $P = .0003$ (by regression analysis).

#8,963 vs. 8,736, $P = .92$ (by regression analysis).

TABLE II Selected Characteristics of Total Abdominal Hysterectomy in New York State, 1990–1996

	Cases*	Rate†	LOS, Days‡	Average Charge, $§	Charge/Day, ‖
1990	30,681	34.0	6.3	7,543	1,197
1991	29,193	32.3	5.8	6,401	1,104
1992	29,999	33.2	5.7	6,645	1,166
1993	27,941	30.8	5.4	7,216	1,336
1994	24,745	27.3	5.2	7,538	1,450
1995	26,489	29.2	4.8	7,541	1,571
1996	25,761	28.4¶	4.5	7,630#	1,696

*Procedure activity as estimated by the Statewide Planning and Resource Cooperative System (SPARCS) database, New York State Department of Health, Bureau of Biometrics.

†Number of cases performed/10,000 females.

‡Mean length of stay (LOS) (days).

§Mean institutional charge for operation (excludes physician's fee; not adjusted for inflation).

‖Average institutional charge/LOS (unadjusted).

¶34.0 vs. 28.4, $P = .01$ (by regression analysis).

#7,543 vs. 7,630, $P = .22$ (by regression analysis).

that mean institutional charge for TAH decreased by more than $1,000 compared to 1990.

Like TAH, the trend of mean charges for SCH was not linear throughout the study interval. The mean institutional charge for SCH in 1990 of $8,963 corresponded to an inflation-adjusted charge of $10,756 in 1996. Surprisingly, hospital charges for SCH were $227 lower in 1996 than in 1990. This change was not significant ($P = .92$).

DISCUSSION

The US has the highest hysterectomy rate in the world, with several hundred thousand cases performed annually,[5] and it is associated with billions of dollars in domestic health care spending each year.[2] The clinical aspects of hysterectomy[6] and its recent augmentation by laparoscopy have been studied by other investigators,[7–10] contributing to greater knowledge about this common operation.

While the percentage of hysterectomies performed through an abdominal incision has been reviewed by others,[11,12] how TAH and SCH partition the general category of abdominal hysterectomy is a matter that has received scant attention. Comparisons between TAH and SCH are few, but when a "decision analysis" model was applied to TAH and SCH,[13] SCH was found to be inferior to TAH. As the second most populous state in the US, New York represented an attractive subset for analysis regarding this phenomenon.

This study of New York State hysterectomy practice agrees with national data that show reductions in the number and rate of hysterectomy in general.[1,2,11,12,14,15] However, this investigation showed for the first time that specific reductions in the TAH rate occurred simultaneous with significant increases in the SCH rate. In addition, during the study period, LOS decreased for TAH and SCH.

What factors might explain these observed fluctuations in New York hysterectomy practice? Selection of a specific abdominal hysterectomy technique is a complex decision, being influenced by a matrix of physician, patient, and perhaps institutional features. Although TAH and SCH are fundamentally similar operations and are usually associated with similar postoperative courses, certain physical or anatomic features (e.g., endometriosis, pelvic adhesions, obesity) may influence some gynecologists' choice of hysterectomy method. Broad surgical discretion is possible in the absence of formal criteria for TAH or SCH. Yet, the impact this would have on TAH and SCH rates during this study period is questionable, as such anatomical features would be expected to remain constant over many years.

Several examples of physician bias relative to use of medical services have been described. Male gynecologists are more likely to perform hysterectomy than their female colleagues,[16,17] and younger practitioners appear to perform fewer hysterectomies than gynecologists more remote from their training.[18] Some surgeons could favor SCH for less direct reasons. For example, the most likely cause for litigation following hysterectomy is urinary tract injury,[19,20] a risk essentially circumvented by SCH. Institutional bias also might contribute to hysterectomy practice patterns as some residency programs could emphasize certain procedures over others, thus strongly influencing the future clinical philosophy of their trainees. However, the manner in which the surgeon's gender, age, training, litigation history, or other characteristics might specifically affect the choice between TAH and SCH remains unknown. These physician parameters likely remained fairly stable during the study period.

The increased utilization of nonsurgical treatments in the management of patients who otherwise would be candidates for hysterectomy[5] might result in only the most refractory patients remaining for hysterectomy, although such effects are not intuitively apparent. For example, an increasing concentration of complex cases might favor the more extensive operation (TAH); conversely, growing conservatism regarding surgical management might favor the more limited approach (SCH).

An even more difficult issue to quantify is the role played by patients in choosing hysterectomy type. As the majority of hysterectomies included in this

analysis were elective, it is assumed that patient treatment preferences were considered and thoughtfully discussed. Some patients may not care which hysterectomy technique is used for their own operation, but an uncertain proportion may bring a specific request to their gynecologists.

How might such consumer preferences develop? This report covered a time during which there was considerable reflection on the merits of SCH, both in academic literature and in the popular press. Indeed, the study of possible links between female reproductive tract symptoms, hysterectomy, and associated quality-of-life changes has a long history outside the US,[21,22] but in recent decades, the subject has become decidedly less obscure here. A patient's perception that superior postoperative urinary or sexual function may follow a particular hysterectomy type may contribute to the request for SCH rather than TAH.

Anatomical justification for better outcomes relative to postoperative sexual or urinary function with SCH has been proposed,[23–25] but the relationship remains largely theoretical and lacks universal consensus.[23,26–29] While it is impossible to prove exactly how these beliefs influence a patient's choice of hysterectomy type, opposition to elective TAH may be based on such tentative grounds.

Several limitations of this study deserve attention. Computer-assisted retrieval of large quantities of patient records is essential to achieve sufficient numbers of reviewed cases for a study of this type, but its accuracy is predicated on proper coding of its constituent records. The database used in this study is assumed to contain a complete record of hospital charges in New York State, since institutional reimbursement is based on diagnosis-related group information extracted from Statewide Planning and Resource Cooperative System data.

Difficulties encountered during a complicated hysterectomy might result in a gynecologist modifying a case, including the decision to perform an unplanned SCH. Such patients, who originally consented for TAH but who received SCH due to unexpected intraoperative findings, were not separately identified in this investigation and were enumerated in the SCH group as if SCH were the planned procedure.

Since the study period spanned a 6-year period when the cumulative effects of inflation could not be ignored, average hysterectomy charges were related to the US Bureau of Labor Statistics' CPI for the interval evaluated. While medical care is one of the major item groups included within the CPI formula, the CPI does not reflect hospital sector inflation perfectly, and this contributes to limitations in the inflation adjustment computed here. The fact that uniform CPI projections were used in the comparisons for both TAH and SCH was thought to give balance to these inherent shortcomings.

It is possible that some hysterectomy cases included for review should have been excluded based on random coding error, but these numbers should be relatively low when compared to a denominator of several million patient records.

SUMMARY

In summary, although the SCH rate increased significantly and the TAH rate declined significantly, the number of TAHs performed remained much larger than for SCH. The significance of these findings is related to the shifts in abdominal hysterectomy technique in New York State and the changes in institutional charge associated with TAH and SCH, as well as the consistent declines in LOS measured for both procedures. Despite gains in SCH utilization, however, there is no indication that this procedure is likely to overtake TAH as the preferred hysterectomy method in New York State for many years. Continued surveillance of hysterectomy practice patterns is necessary to establish the importance of these preliminary findings. Patient and physician surveys would be helpful in identifying factors driving these changes, and they form the basis of ongoing research. An improved understanding of hysterectomy utilization could be useful in the development of objective clinical guidelines to balance economic pressures that influence future medical practice.

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