

Incremental direct and indirect cost burden attributed to endometriosis surgeries in the United States

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Objective: To compare direct and indirect costs between endometriosis patients who underwent endometriosis-related surgery (surgery cohort) and those who have not received surgery (no-surgery cohort).

Design: Retrospective cohort study.

Setting: Not applicable.

Patient(s): Endometriosis patients (aged 18–49 years) with (n = 124,530) or without (n = 37,106) a claim for endometriosis-related surgery were identified from the Truven Health MarketScan Commercial and Health and Productivity Management databases for 2006–2014.

Intervention(s): Not applicable.

Main Outcome Measure(s): Primary outcomes were healthcare utilization during 12-month pre- and post-index periods, annual direct (healthcare) and indirect (absenteeism and short- and long-term disability) costs during the 12-month post-index period (in 2014 US dollars). Indirect costs were assessed for patients with available productivity data.

Result(s): Patients in the surgery cohort had significantly higher healthcare resource utilization during the post-index period and had mean annual total adjusted post-index direct costs approximately three times the costs among patients in the no-surgery cohort (\$19,203 [SD \$7,133] vs. \$6,365 [SD \$2,364]; average incremental annual direct cost = \$12,838). The mean cost of surgery (\$7,268 [SD \$7,975]) was the single largest contributor to incremental annual direct cost. Mean estimated annual total indirect costs were \$8,843 (surgery cohort) vs. \$5,603 (no-surgery cohort); average incremental annual indirect cost = \$3,240.

Conclusion(s): Endometriosis patients who underwent surgery, compared with endometriosis patients who did not, incurred significantly higher direct costs due to healthcare utilization and indirect costs due to absenteeism or short-term disability. Regardless of the surgery type, the cost of index surgery contributed substantially to the total healthcare expenditure. (Fertil Steril® 2017;107:1181–90. ©2017 by American Society for Reproductive Medicine.)

Key Words: Administrative claims database, endometriosis, surgery, work loss

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Endometriosis, a gynecologic disease in which endometrial-like tissue grows outside the uterus and typically accompanied by pelvic

pain and inflammation, afflicts 5%–10% of reproductive-age women in the United States (1). The actual prevalence of endometriosis remains unclear

and is likely underreported owing to diagnostic delay and symptom overlap with other diseases like irritable bowel syndrome, pelvic inflammatory disease, fibromyalgia, and others (2–4). Endometriosis is associated with a significant direct and indirect cost burden among patients (5–7); for example, a recent systematic literature review that examined studies published from 2000 to 2013 estimated the direct costs associated with endometriosis to be \$12,118 per patient per year, and the indirect costs of endometriosis to be \$15,737 per patient per year in the United States (6).

Both pharmacotherapy and surgery are used in clinical practice to manage

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endometriosis (8, 9). For patients who do not respond sufficiently to or are intolerant of pharmacotherapy, surgical interventions are a commonly used and effective management option (8, 10, 11). In women willing to lose fertility, bilateral salpingo-oophorectomy or hysterectomy (with or without oophorectomy) are regarded as the most effective surgical interventions; more conservative procedures can also be used, especially when preservation of fertility is desired (8, 11).

Surgical treatment is a substantial source of costs among endometriosis patients. A multicenter, international, prospective study (7) using European Union data estimated that, on average, 29% of the endometriosis-specific healthcare costs were due to surgery. Another study found that more than 65% of US endometriosis patients underwent surgery within the first year of diagnosis, and the average cost of surgery ranged from \$4,289 for a diagnostic laparoscopy to \$11,397 for abdominal hysterectomy (12).

The present study aims to provide a current evaluation of the cost burden (both direct and indirect) of surgery among endometriosis patients in the US real-world practice. This retrospective analysis estimates the incremental direct and indirect healthcare costs among endometriosis patients who underwent endometriosis-related surgical procedures compared with patients without endometriosis-related surgery. We hypothesized that patients with endometriosis-related surgery incur higher healthcare costs than those who do not undergo surgery.

MATERIALS AND METHODS

Data Source

Data for this retrospective analysis were extracted from the Truven Health MarketScan Commercial Claims and Encounters (Commercial) and the Health and Productivity Management databases for the period of January 1, 2006 through June 30, 2014.

The Commercial database contains information from insurance claims on the inpatient and outpatient healthcare history of approximately 40 million employees, their dependents, and retirees covered under various fee-for-service, preferred provider organizations, and capitated health plans across the United States. The medical and pharmacy claims in MarketScan Research Databases are based on the UB-04 and CMS-1500 health insurance claim forms submitted by providers to the insurance companies of contributing employers and include information on services rendered and associated diagnostic codes, as well as filled pharmacy claims. Claims-based data sets have the advantage of containing relatively comprehensive data on the full spectrum of care a patient receives, with the ability to track very large numbers of patients longitudinally by requiring continuous enrollment during the time of interest. A major limitation of claims-based data is its foundation as a system designed for reimbursement rather than for research purposes. This can result in diagnostic and procedure coding that can contain inaccuracies, difficulty in determining causation, and an absence of data on medical care not subject to insurance reimbursement, such as for over-the-counter medications (13–16). Claims data have been used to

investigate a wide variety of disease areas for decades; more specifically, the MarketScan Commercial database has been successfully used previously to investigate patterns of treatment and costs associated with endometriosis (5, 12, 17).

The Health and Productivity Management database includes information on workplace absenteeism, short-term disability (STD), long-term disability (LTD), and compensations from employer payroll systems and disability case records for a subset of patients in the MarketScan Commercial database for which such information was consistently available for the time period of the study.

The MarketScan Research Databases comprise de-identified administrative healthcare claims data and comply with the US patient confidentiality requirements, including the Health Insurance Portability and Accountability Act of 1996.

Study Population

Women aged 18–49 years with a claim for hysterectomy, oophorectomy, laparotomy or laparoscopy, or other endometriosis-related procedure (e.g., ablation/excision/fulguration) between January 1, 2006 and June 30, 2014 with a diagnosis of endometriosis (International Classification of Diseases, Clinical Modification, Ninth Edition [ICD-9-CM], Code 617.x) in a primary or secondary position on a nondiagnostic medical claim on the day of surgery/procedure were identified as the surgery cohort. The date of the surgery was selected as the index date. Female patients in the no-surgery cohort had an endometriosis diagnosis in any position on a nondiagnostic medical claim between January 1, 2006 and June 30, 2014 with no evidence of undergoing any endometriosis-related surgery during the entire study period or preceding the index date; their index date was a randomly assigned date following the first endometriosis diagnosis. All patients across both study cohorts were required to have continuous health plan coverage for 12 months before and after the index date (pre-index and post-index periods). In the no-surgery cohort, the requirement of continuous health plan enrollment, which ensures all of the patient's encounters with the healthcare system that resulted in claims were captured for at least 12 pre-index months, along with the exclusion of patients with evidence of relevant surgical procedures before index, helped to ensure these were endometriosis cases untreated by surgical means in the United States previously (although it does not rule out the chance that some patients who might have received surgery outside of the US healthcare system may be included). Patients with a medical claim indicating a diagnosis of malignant neoplasm of female genitourinary organs (ICD-9-CM: 179.x–184.x) or radical hysterectomy during the 12-month pre-index (baseline) period were excluded from analysis.

Patients in the surgery cohort were further stratified according to the type of index surgery: hysterectomy, oophorectomy, laparotomy, and laparoscopy. A small number of surgery patients with other miscellaneous procedures—excisions, ablation, or fulguration—were excluded from analysis. Patients who underwent multiple procedures on the index date were grouped according to the following hierarchy:

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