GYNECOLOGY

Disparities in the management of ectopic pregnancy

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BACKGROUND: Ectopic pregnancy is common among young women. Treatment can consist of either surgery with salpingectomy or salpingostomy or medical management with methotrexate. In addition to acute complications, treatment of ectopic pregnancy can result in long-term sequelae that include decreased fertility. Little is known about the patterns of care and predictors of treatment in women with ectopic pregnancy. Similarly, data on outcomes for various treatments are limited.

OBJECTIVE: We examined the patterns of care and outcomes for women with ectopic pregnancy. Specifically, we examined predictors of medical (vs surgical) management of ectopic pregnancy and tubal conservation (salpingostomy vs salpingectomy) among women who underwent surgery.

STUDY DESIGN: The Perspective database was used to identify women with a diagnosis of tubal ectopic pregnancy treated from 2006–2015. Perspective is an all-payer database that collects data on patients at hospitals from throughout the United States. Women were classified as having undergone medical treatment, if they received methotrexate, and surgical treatment, if treatment consisted of salpingostomy or salpingectomy. Multivariable models were developed to examine predictors of medical treatment and of tubal conserving salpingostomy among women who were treated surgically.

RESULTS: Among the 62,588 women, 49,090 women (78.4%) were treated surgically, and 13,498 women (21.6%) received methotrexate. Use of methotrexate increased from 14.5% in 2006 to 27.3% by 2015 ($P<.001$). Among women who underwent surgery, salpingostomy decreased over time from 13.0% in 2006 to 6.0% in 2015 ($P<.001$). Treatment in more recent years, at a teaching hospital and at higher volume centers, were associated with the increased use of methotrexate ($P<.05$ for all). In contrast, Medicaid recipients (adjusted risk ratio, 0.92; 95% confidence interval, 0.87-0.98) and uninsured women (adjusted risk ratio, 0.87; 95% confidence interval, 0.82-0.93) were less likely to receive methotrexate than commercially insured patients. Among those who underwent surgery, black (adjusted risk ratio, 0.76; 95% confidence interval, 0.69-0.85) and Hispanic (adjusted risk ratio, 0.80; 95% confidence interval, 0.66-0.96) patients were less likely to undergo tubal conserving surgery than white women and Medicaid recipients (adjusted risk ratio, 0.69; 95% confidence interval, 0.64-0.75); uninsured women (adjusted risk ratio, 0.60; 95% confidence interval, 0.55-0.66) less frequently underwent salpingostomy than commercially insured patients.

CONCLUSION: There is substantial variation in the management of ectopic pregnancy. There are significant race- and insurance-related disparities associated with treatment.

Key words: disparity, ectopic pregnancy, methotrexate, salpingectomy, salpingostomy

The incidence of ectopic pregnancy, defined as the implantation of a fertilized ovum outside of the endometrium, varies between 1–2% in the general population.[1,2] Despite advances in early diagnosis and management, complications that arise from ectopic pregnancy remain a significant cause of morbidity and death in the first trimester. Using pregnancy-related death estimates from 1991–1999, mortality rate was calculated to be 31.9 per 100,000 cases of ectopic pregnancy.[3] In addition to acute morbidity, ectopic pregnancy may decrease future fertility.

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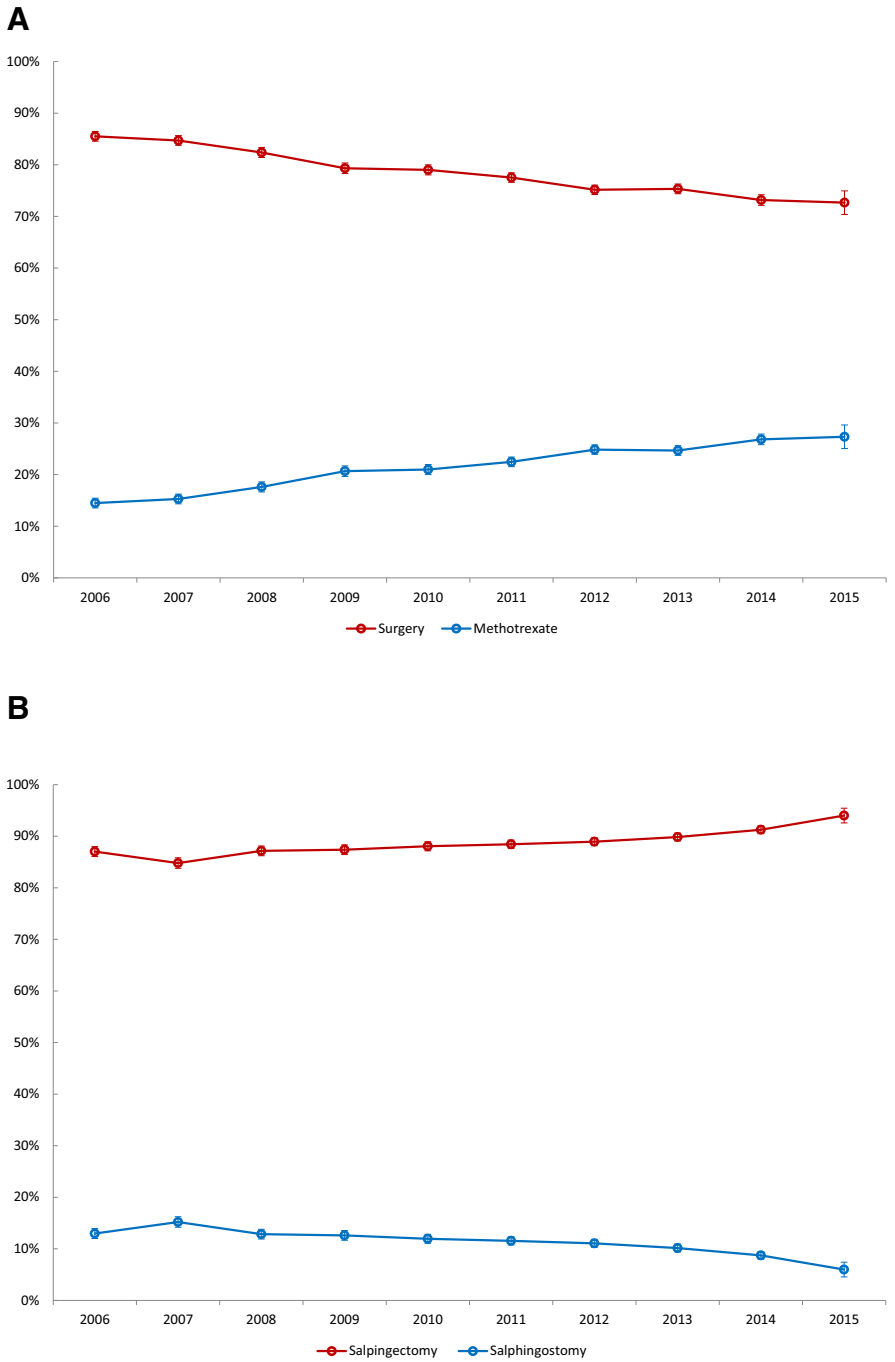
Women with ectopic pregnancy typically are treated either medically with methotrexate or surgically. Methotrexate is administered via intramuscular injection and offers a noninvasive route of treatment. Surgical treatment most commonly consists of either salpingectomy or salpingostomy with tubal preservation. With conservative management via methotrexate or salpingostomy, close follow up with serial measurements of quantitative beta human chorionic gonadotropin is imperative to ensure resolution.[4]

Multiple clinical criteria are used to evaluate the suitability of patients for medical vs surgical treatment.[5] There are recent data that promote the benefits of tubal conservation to optimize future fertility without excessive risk of recurrent ectopic pregnancy.[6,7] However, data are conflicting with regard to actual fertility outcomes in cases of tubal conservation, with some studies suggesting no difference in intrauterine pregnancy rates between conservative management and salpingectomy,[7-9] but others reflecting significant improvement in fertility with conservative management.[6] At minimum, the results support a thoughtful discussion with patients about the risk-benefit calculus in the context of their reproductive goals and personal preferences.

To date, little is known about the patterns of care for management of ectopic pregnancy in the United States. We performed a population-based analysis to examine the patterns of care and outcomes for women with ectopic pregnancy. Specifically, we examined factors that are associated with medical management of ectopic pregnancy and tubal conservation among women who underwent surgery.

FIGURE
Trends in management of ectopic pregnancy



A, Use of medical vs surgical treatment for ectopic pregnancy. **B,** Use of salpingectomy vs salpingostomy among women with ectopic pregnancy who underwent surgical treatment.

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Methods

Patients and procedures

We used the Perspective database (Premier, Charlotte, NC) to identify women 15−60 years old with ectopic pregnancy who were treated from 2006 to the first quarter of 2015. This all-payer database captures insurance claims data from >500 acute care hospitals, which represent approximately 15% of hospitalizations nationally.[10] Hospitals included in the dataset report data on all patients who were treated within the given facility (inpatient and outpatient). Perspective captures data on clinical and demographic characteristics of patients and diagnoses and procedures billed through International Classification of Diseases, ninth revision (ICD-9), codes. Additionally, Perspective captures drugs received by patients and services rendered through capture of billing and use codes.

Treatment was classified as either medical with methotrexate or surgical with salpingostomy or salpingectomy. Methotrexate use was identified from hospital billing records; salpingostomy (ICD-9 codes 66.01, 66.02) and salpingectomy (ICD-9 codes 65.41, 65.49, 66.4, 66.5, 66.51, 66.52, 66.62, 66.63, 66.69) were identified based on ICD-9 procedure codes. Patients with codes for both salpingostomy and salpingectomy were classified as having undergone salpingectomy.

Demographic and clinical data included age at the time of the treatment (<20, 20-24, 25-29, 30-34, 35-39, 40-44, and ≥45 years), year of the treatment, marital status (married, single, and other/unknown), and primary insurance status (commercial, Medicare, Medicaid, uninsured, and unknown). Race was self-reported and categorized as white, black, Hispanic, and other/unknown. The Elixhauser comorbidity index, a measure of underlying medical comorbidity based on defined coding, was used to classify comorbid diseases in patients. The index was classified into 0, 1, and ≥2 based on the number of comorbid medical conditions.

Hospitals were categorized based on location (urban or rural), teaching status (teaching or nonteaching), hospital bed size (<400, 400−600, and >600 beds), and region of the country defined within the dataset (Northeast, Midwest, West, and South). Annualized hospital volume was calculated for each