OBSTETRICS

United States emergency department visits for vaginal bleeding during early pregnancy, 1993-2003

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OBJECTIVE: The purpose of this study was to describe the epidemiology of emergency department (ED) visits for vaginal bleeding during early pregnancy (VBEP).

STUDY DESIGN: We analyzed data from the National Hospital Ambulatory Medical Care Survey, 1993-2003. Cases presented with a complaint of vaginal bleeding and had diagnoses consistent with presentation during early pregnancy.

RESULTS: Over the 11-year period, there were 5.4 million visits for VBEP, which represents 1.6% of all ED visits or almost 500,000 visits/year. ED visits for VBEP increased from 5.6-7.8 visits per 1000 US population (P for trend $< .01$). The population rates were highest in the 20-29 year age group. ED patients with VBEP were more likely to be black, Hispanic, and uninsured, as compared to women presenting for other reasons.

CONCLUSION: ED visits for VBEP are rising, particularly among younger and Hispanic women. Programs that ensure primary obstetric care would help decrease reliance on the ED for this important condition.

Key words: emergency department visits, pregnancy, vaginal bleeding

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Vaginal bleeding during early pregnancy is common, complicating 15-25% of all pregnancies.[1-4] Approximately 50% of women who experience bleeding will miscarry.[5] This risk rises with increased maternal age. Those who do not miscarry have increased risk of other complications associated with the pregnancy, including preterm delivery and low-birthweight infants.[6] Many of these patients present to the emergency department (ED) for evaluation, but there are very limited data on this topic.

Prior studies on bleeding in early pregnancy have been conducted through obstetric and primary care centers.[2,7] These studies have reaffirmed the incidence of vaginal bleeding during early pregnancy and noted risk factors for the condition, including advanced maternal age, previous spontaneous or induced abortion, infertility problems, and working during pregnancy.[2,7] Patients with bleeding during early pregnancy require closer monitoring during the remainder of the pregnancy. Multiple studies have commented on the importance of ultrasonography in women with bleeding during early pregnancy to determine fetal viability.[8,9] A viable fetus on ultrasound examination in the setting of first-trimester bleeding has been associated with a high rate of continuation of the pregnancy beyond 20 weeks.[8,9]

Patients who seek evaluation and treatment in the ED are likely different than the patient populations of these prior studies. Understanding the ED population is important in order to identify the necessary resources for follow-up care and monitoring after initial emergency evaluation. The objective of our study was to describe the clinical epidemiology of women presenting to the ED with bleeding in early pregnancy, including patient demographics, frequency of ultrasound ordering, and risk of hospital admission.

Materials and Methods

National Hospital Ambulatory Medical Care Survey (NHAMCS) data from 1993-2003 were combined for analysis.[10-21] NHAMCS is a 4-stage probability sample of visits to noninstitutional general and short stay hospitals, excluding federal, military, and Veterans Affairs hospitals, located in the 50 States and the District of Columbia.[22] Examples of institutional hospitals include university health services or nursing home facilities. Nationwide, 85% of hospitals are included in this survey, of which 78% are urban. NHAMCS is conducted annually and covers geographic primary sampling units, hospitals within primary sampling units, EDs within hospitals, and patients within EDs. Hospital staff collected data during a randomly assigned 4-week data period for each of the sampled hospitals, approximately once every 15 months. Trained hospital staff performed visit sampling and data

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collection, and a Bureau of Census field supervisor performed review of data collection. Experienced National Center for Health Statistics (NCHS) coders performed data abstraction centrally. Quality control included computer checks to assess inconsistencies with value ranges, a 2-way 10% independent procedure for medical and drug coding, and adjudication by NCHS for ambiguous or illegible responses for fields including reasons for visit and diagnosis. The nonresponse rate for most items was less than 5%, and error rates were less than 2% for items that required medical coding.

When the data collection forms were completed, they were sent to the Constella Group (Durham, NC), where they were coded using the International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM). National estimates were obtained through use of a multistage estimation procedure with 3 basic components (inflation by reciprocals of the sampling selection probabilities, adjustment for nonresponse, and a population weighting ratio adjustment) and patient visit weights. A more detailed description of the NHAMCS data collection and estimation procedures is available for review in the technical notes section of each year's NHAMCS Emergency Department Survey.[23]

We identified cases if they had ICD9-CM code 640 (hemorrhage in early pregnancy) in any of the 3 diagnoses fields. Cases were also identified if their chief complaint of visit was 17550 (uterine and vaginal bleeding) or 17902 (spotting or bleeding during pregnancy) AND they had ICD-9-CM code 630 to 640 (630-633: ectopic or molar pregnancy, 634-639: other pregnancy with abortive outcome) in any of the 3 diagnoses fields. Patient reasons for visit were coded using Reason for Visit Classification for Ambulatory Care, a standardized sourcebook used in NCHS studies.[24] Noncases included women presenting to the ED with diagnoses not consistent with VBEP.

US visit rates were computed using midyear age, race, ethnic, and region-specific population estimates from the US Census Bureau; all rates were reported per 1000 individuals per year for the female US resident population between the ages of 12-54 per year.[25] Pregnancy rates were calculated based on CDC National Vital Statistics Reports (1990-2000).[26]

We analyzed ED visit rates by age, race, Hispanic ethnicity, and US region (Northeast, Midwest, South, and West). ED visit rates for VBEP were reported per 1000 total ED visits for all complaints. Regions represent standardized geographic divisions defined by the US Bureau of the Census. Visits were further analyzed by insurance status, admission status, treatments and the acuity of the medical problem ("urgent/emergent") recorded at triage. To keep analyses between earlier and later years consistent, we coded visits that occurred after a change in coding in 1997 (1997-2003), as "urgent/emergent" if immediacy to be seen was recorded as "less than 15 minutes" or "15-60 minutes," and as "nonurgent" if recorded as "> 1-2 hours" or longer. From 1993-1994 up to 5 medications were recorded per encounter, from 1995-2002 up to 6 medications, and in 2003 up to 8 medications were recorded per encounter, with medications coded as per published NCHS definitions.[27,28]

We performed all analyses using STATA 9.0 (StataCorp, College Station, TX). Information from a masked ultimate cluster sample design was used to estimate variance. Analyses included proportions and 95% confidence intervals (CIs), Pearson's chi-square, and multivariate logistic regression. Variables in the multivariate model (age, race, region, insurance, admission rate, visit urgency, and RhoGAM administration) were chosen a priori. Trends were calculated using a contrast for linear trends test appropriate for survey data. All 2-sided P values $< .05$ were considered statistically significant. This study was exempt from approval by the institutional review board due to data collection through a federal dataset with no identifiable private data obtained.

RESULTS

Between 1993 and 2003, VBEP accounted for approximately 5.4 million (95%CI, 4.8-5.9 million) visits to the ED or almost 500,000 per year. This corresponded to 1.6% (95%CI, 1.4-1.7) of all ED visits. There were approximately 730,000 visits for women age ≥ 35 years over the 11-year period, accounting for 14% of all VBEP visits.

As shown in Table 1, the overall US population rate was 5.9 per 1000 women (95% CI, 5.3-6.5). The population rates were highest among the 20-29 year age group (14.7; 95% CI, 13.1-16.4) and were similar between teens and those aged 30-39 (6.0 and 5.0, respectively). ED visits for VBEP were more common among blacks than whites in the general population, but as a percentage of ED visits blacks and whites did not differ. Hispanics had a higher US population rate (10.5; 95% CI, 8.6-12.3) compared to nonHispanics (1.4; 95% CI, 3.7-4.7) as well as a higher ED rate (35.5 vs 4.6). Lastly, although population rates were similar between regions, those in the western US had higher ED visit rates for VBEP compared with all other regions (6.8 vs between 5.3 to 6.0).

The Figure demonstrates the significant upward trend, over the 11-year period, for VBEP population rates overall (P for trend $< .01$). Although the ED visit rate also appears to be rising, this was not statistically significant. The US population rates increased in multiple subgroups—for whites (4.7-7.2; $P < .01$), blacks (11.7-13.0; $P = .04$), women < 35 (9.3-12.9; $P < .01$), women ≥ 35 (1.2-2.7; $P < .001$)—and for each region (Northeast 3.9-7.6; Midwest 5.2-7.7; South 6.8-8.2, and West 5.7-7.5; all $P < .05$). By contrast, trends for the proportion of ED visits due to VBEP only were significant among those age < 35 years ($P < .001$) and those from the western US ($P < .01$).

There were significant demographic differences between VBEP cases and noncases. VBEP cases were more likely to be age < 35 years (eg, 86% of cases vs 54% of noncases; $P < .001$). VBEP patients also were more likely to be black (26% vs 21%; $P < .001$), Hispanic (21% vs 10%; $P < .001$), and to present to a western ED. In addition, VBEP cases were more likely to be uninsured compared with noncases (26% vs 15%; $P <$