Preoperative Pregnancy Testing in Ambulatory Surgery

Incidence and Impact of Positive Results

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Background: The incidence of unrecognized early pregnancy and its influence on the surgical and anesthetic course in patients presenting for elective ambulatory surgery have not been previously determined. The current study was designed to determine the incidence of unrecognized pregnancy in women presenting for ambulatory surgery. In addition, it examined how discovery of the pregnancy altered the anesthetic or surgical course.

Methods: In a prospective study over a 1-yr period, all women of childbearing potential (defined as menstruating women without prior hysterectomy or tubal ligation) were preoperatively evaluated and tested for urine or serum human chorionic gonadotropin, to determine unrecognized pregnancy. If a pregnancy was detected, the disposition of the surgical procedure and the effect on the surgery was recorded.

Results: Of 2,056 women of childbearing potential presenting for ambulatory surgery, testing revealed 7 previously unrecognized pregnancies, an incidence of 0.3%. Included among these patients were two patients scheduled to undergo fertility procedures. On learning the test result and even before being advised of available options, all patients elected to cancel or postpone the surgical procedure.

Conclusions: The incidence of previously unrecognized pregnancy in menstruating women presenting for ambulatory, nonobstetric surgery was 0.3%. The knowledge of a positive test result in cancellation or postponement of the operative procedure. Patient desire for cancellation was the main determining factor in each case. (Key words: Pregnancy testing; Preoperative testing; Surgery: ambulatory; nonobstetric; outpatient.)

THE first trimester of pregnancy is a critical time for the developing fetus. Accepted practice indicates the avoidance of surgery and anesthesia, nonessential drugs, and potentially detrimental uterine changes.1-4 Unfortunately, it is also during this trimester that pregnancy is often unrecognized by both patient and physician, and can be difficult to ascertain from either preoperative history or physical examination.5 Therefore, some women presenting for elective surgery and anesthesia could unknowingly be pregnant. Thus, some centers have instituted routine preoperative pregnancy testing.

Preoperative laboratory testing has undergone renewed scrutiny. The focus is now on gathering laboratory information pertinent only to the immediate surgical or anesthetic care of the patient. Unless an abnormality is suspected based on patient history or physical examination and that abnormality will influence the planned care, most laboratory tests are considered unnecessary, and may contribute to delays in the operative schedule and increased costs. Because the incidence of unrecognized pregnancy or its influence on planned surgical and anesthetic care have not been previously reported in patients scheduled to undergo elective ambulatory surgery, the need for routine preoperative pregnancy testing in these patients has not been established. The current study was conducted to determine the incidence of unrecognized pregnancy in women presenting for ambulatory surgery. The study examined how discovery of the pregnancy altered the anesthetic or surgical course.

Materials and Methods

The current study was conducted in a metropolitan community teaching hospital. The institutional review board approved the study. A computer-generated randomization schedule was used to assign patients to preoperative pregnancy testing. The study population consisted of 2,056 women presenting for ambulatory surgery over an 18-mo period. Patients who had prior hysterectomy or were using oral contraceptives were excluded from the study.

By protocol, all women scheduled for ambulatory surgery were interviewed, preoperatively, and a urine specimen was obtained for pregnancy testing. If positive, the physician was consulted, and the patient was advised to present to the nearest pregnancy center for counseling and pregnancy termination. If negative, the patient was instructed to present to the nearest hospital for further evaluation.

Pregnancy testing was routine for all patients within 7 days of the scheduled surgery. Pregnancy testing was not performed if the patient refused to undergo pregnancy testing. The patient was informed of the option of pregnancy testing and the potential risks associated with pregnancy if the test were not performed.

Pregnancy testing was performed using a qualitative assay (Tandem ICON II, Immunicon, Inc., Costa Mesa, CA) with a sensitivity of 0.5 milli-international unit/ml. The assay was performed using a colorimetric reaction (Abbott Laboratories, Chicago, IL) to detect the presence of human chorionic gonadotropin (hCG) in urine specimens.

In cases of positive pregnancy test results, the patient was counseled by the surgeon and given the option of surgical care. The patient was then referred to the nearest pregnancy center for counseling and pregnancy termination. The patient was informed of the option of pregnancy testing and the potential risks associated with pregnancy if the test were not performed.


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Materials and Methods

The current study was conducted in our 497-bed metropolitan community teaching hospital. With institutional review board approval, all women scheduled to undergo elective ambulatory surgery during a 1-yr period between March 30, 1991, and April 1, 1992, were interviewed, preoperatively. Initial inquiries distinguished premenstrual and menopausal from menstruating women. The patients were specifically asked about prior surgical sterilization, the possibility of pregnancy including sexual activity, and date of last menstrual period. The use of oral contraceptives was incidentally obtained when inquiring about the use of medications. Information concerning the use of other contraceptives was not elicited, because their use cannot exclude the possibility of pregnancy. The history was first obtained by the ambulatory surgery nurse or physician’s assistant, and again during the preoperative evaluation by the physician providing anesthesia care. Based on this interview, those women determined to be of childbearing potential (defined as menstruating women without prior hysterectomy or tubal ligation) were preoperatively tested for the presence of urine or serum human chorionic gonadotropin (hCG).

Pregnancy tests were routinely performed within 6 days of the scheduled surgery. Occasionally, when tests were not previously performed, urine or blood for hCG were obtained on the day of surgery in the ambulatory surgery unit. Urine hCG was usually performed unless the patient was unable to void at the time of testing. In that case, a serum hCG was performed. Urine hCG was analyzed using an immunocapture qualitative assay (Tandem ICON II hCG, Hybritech, Inc., San Diego, CA) with a sensitivity of 25 mIU hCG/ml. Serum tests were performed with an Abbott total β-hCG quantitative assay (Abbott Laboratories, Abbott Park, IL) capable of detecting the total β-hCG to a level of 5 mIU hCG/ml.

In cases of positive pregnancy test, the anesthesiologist and surgeon informed the patient of the result and of the rare potential of a false-positive test result. The importance of the first trimester of pregnancy in fetal development was explained. A reasonable review of the risks, including premature labor, miscarriage, low birth weight, potential direct and indirect effects of anesthetics on fetal well being, and a remote possibility of teratogenicity to the fetus were related to the patient. When appropriate, the patients were informed of the options: to proceed with surgery and anesthesia as planned, proceed with surgery and anesthesia in modified form, or postpone the procedure until a later date. A decision was reached in accordance with the patients wishes. The disposition of the surgical procedure and the effect on the anesthetic management was recorded. Patients with positive pregnancy tests were referred to their personal physicians for confirmation of the diagnosis and further care.

The measured incidence of positive pregnancy tests in our study was used to calculate the 95% binomial confidence limits on true incidence of pregnancy in our study population. The binomial test of proportions was used to compare the incidences of positive pregnancy tests in the subgroup of patients scheduled to undergo fertility procedures to those undergoing nonfertility procedures. Statistical significance was accepted when the calculated probability was less than 0.05.

Results

Of 2,944 women presenting for outpatient surgery during the study period, 2,056 (69.8%) satisfied the criteria as potentially childbearing and, thus, received pregnancy testing. Testing revealed the presence of hCG in seven women (three by urine and four by serum), an incidence of 0.3% with a two-sided 95% confidence interval of 0.1–0.7%. Scheduled surgical procedures included three otoaryngologic, two gynecologic, and two in vitro fertilization. Based on a total of 195 patients scheduled to undergo fertility procedures, the incidence of unrecognized pregnancy in this subgroup of patients was 1%. This incidence of positive pregnancy test in patients scheduled to undergo fertility procedures was not statistically significantly (P = 0.0981) different from that in patients scheduled for nonfertility outpatient procedures.

These seven patients were previously unaware of their pregnancy and even denied the possibility of pregnancy during the preoperative interview. On learning the test result and even before being advised of available options, all seven patients elected to cancel or postpone the surgical procedure. In each case, the decision was made with the concurrence of the surgeon and anes-
Discussion

The current study demonstrates that routine preoperative pregnancy testing uncovered an 0.3% incidence of previously unrecognized early pregnancy in patients scheduled to undergo ambulatory surgical procedures. These results were obtained despite a preoperative interview that was designed to detect pregnancy. Because of the subtlety of early symptoms and signs, delayed or irregular menses, misconceptions regarding pregnancy and contraceptives, embarrassment, interview location restraints, or denial, history is often not helpful in determining early pregnancy. The determination of early pregnancy by physical examination is difficult, even by the experienced physician.6 In addition, because of logistic constraints, gynecologic examinations are rarely performed as part of a routine presurgical physical examination in ambulatory surgical patients. Thus, measuring hCG, in either urine or serum, has become the accepted method of pregnancy detection. Because the presence of hCG can be detected as early as 7–9 days postconception, the possibility of a false-negative result (true pregnancy despite a negative test result) is extremely remote.8,9

The value for routine pregnancy testing before elective outpatient surgery is controversial. During routine preoperative testing of adolescent girls, Malviya et al.10 found one positive pregnancy test (later determined to be a false positive) in 179 patients tested. Relying on these preliminary data, Malviya et al.10 concluded that an accurate and detailed history was a suitable alternative routine preoperative pregnancy testing. Data from recent surveys of anesthesiologists show that over 55% believe that routine preoperative hCG testing is acceptable practice, although only 24–35% actually perform the tests routinely at their institutions.10,11 Previously routine preoperative tests, such as chest radiograph, electrocardiogram, and electrolytes, have been generally discarded, because abnormalities discovered usually failed to have any significant affect on perioperative management.12–14 Unlike these tests, the current study has demonstrated an alteration in perioperative management after a positive pregnancy test.

Although there is no absolute contraindication to surgery or anesthesia in the pregnant patient, the general consensus is that elective surgery should be avoided, or at least deferred, until later in the pregnancy.1,5,10–12 In addition, anesthesia and surgery in the pregnant patient may expose the fetus to potentially harmful perioperative procedures, such as x-ray or fluoroscopy,20,21 or to potentially harmful drugs, such as antibiotics, antiarrhythmics, nonsteroidal anti-inflammatory drugs, topical nasal administration of cocaine, and newer drugs whose safety during pregnancy have not been tested.22–24

All patients in the current study that tested positive chose to defer surgery. In each case, patient desire for cancellation was the main determining factor, and the decision was made even before pertinent options and risks could be presented. It has been our experience since instituting routine preoperative pregnancy testing in our center that the presentation of options and risks have little influence on the patient’s decision to proceed with surgery. Although all of our patients with a positive test were later determined to be truly pregnant, the possibility of a false-positive test in a nonpregnant patient test result should be discussed with the patient. It is interesting that two of our seven unrecognized pregnant patients were scheduled for fertility procedures. These two patients were particularly delighted on learning the test results and the fact that surgery was avoided.

It is difficult to attach a monetary value to the benefits derived from preoperative pregnancy testing, and the unknown potential cost associated with nontesting (such as maternal-fetal untoward events). Using 1994 figures, the real cost (to the hospital) of performing pregnancy testing on all women of child-bearing potential presenting for elective ambulatory surgery was approximately $20,148.00, based on a weighted average (for either urine or serum hCG analysis) charge of $9.80 per test. With seven cases of unrecognized pregnancy uncovered from preoperative pregnancy testing, the actual cost was $2,879 per pregnancy discovered (with a theoretical 95% lower bound of $1,439 per pregnancy discovered). The issue of cost effectiveness of routine preoperative pregnancy testing remains unclear.

In summary, the incidence of previously unrecognized pregnancy in menstruating women presenting for ambulatory, nonobstetric surgery was 0.3%. The knowledge of a positive pregnancy test resulted in cancellation or postponement of the operative procedure.
with patient desire for cancellation as the main determining factor in each case.

References