Original Research

Safety of Medical Abortion Provided Through Telemedicine Compared With In Person

Daniel Grossman, MD, and Kate Grindlay, MSPH

OBJECTIVE: To compare the proportion of medical abortions with a clinically significant adverse event among telemedicine and in-person patients at a clinic system in Iowa during the first 7 years of the service.

METHODS: We conducted a retrospective cohort study. We analyzed data on clinically significant adverse events (hospital admission, surgery, blood transfusion, emergency department treatment, and death) for all medical abortions performed by telemedicine or in person at a clinic system in Iowa between July 1, 2008, and June 30, 2015. Data on adverse events came from required reporting forms submitted to the mifepristone distributor. We calculated the prevalence of adverse events and 95% CIs comparing telemedicine with in-person patients. The analysis was designed as a noninferiority study. Assuming the prevalence of adverse events to be 0.3%, telemedicine provision was considered to be inferior to in-person provision if the prevalence were 0.6% or higher. The required sample size was 6,984 in each group (one-sided $\alpha=0.025$, power 90%). To explore whether patients with adverse events presented to emergency departments and were not reported, we conducted a survey of the 119 emergency departments in Iowa, asking whether they had treated a woman with an adverse event in the prior year.

RESULTS: During the study period, 8,765 telemedicine and 10,405 in-person medical abortions were performed. Forty-nine clinically significant adverse events were reported (no deaths or surgery; 0.18% of telemedicine patients with any adverse event [95% CI 0.11–0.29%] and 0.32% of in-person patients [95% CI 0.23–0.45%]). The difference in adverse event prevalence was 0.13% (95% CI −0.01% to 0.28%, $P=.07$). Forty-two emergency departments responded to the survey (35% response rate); none reported treating a woman with an adverse event after medical abortion.

CONCLUSION: Adverse events are rare with medical abortion, and telemedicine provision is noninferior to in-person provision with regard to clinically significant adverse events.

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From Advancing New Standards in Reproductive Health (ANSIRH), Bixby Center for Global Reproductive Health, Department of Obstetrics, Gynecology and Reproductive Sciences, University of California, San Francisco, San Francisco, California; and Ibis Reproductive Health, Cambridge, California.

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Corresponding author: Daniel Grossman, MD, ANSIRH, 1330 Broadway, Suite 1100, Oakland, CA 94612; email: Daniel.Grossman@UCSF.edu.

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Medical abortion involves the use of mifepristone and misoprostol to terminate a pregnancy up to 10 weeks of gestation.[1] Planned Parenthood of the Heartland in Iowa began offering medical abortion by telemedicine in 2008.[2] Iowa law states that only a physician may perform an abortion, and telemedicine extends the reach of the small number of physicians willing to provide the service in the state. A similar model has also been introduced in Alaska.[3]

Prior research has found that provision of medical abortion by telemedicine is equally effective as in-person provision, and some measures of satisfaction were significantly higher for telemedicine patients.[2] The introduction of telemedicine at Planned Parenthood of the Heartland clinics was associated with a significant increase in the proportion of abortions that were performed with medication and a significant reduction in abortions performed after 12 weeks of gestation.[4] Adverse events were uncommon with

telemedicine provision, but prior research comparing the safety of the two models had limited power to detect a difference in the prevalence of these rare events.[2] The objective of this retrospective cohort study was to determine whether telemedicine provision of medical abortion was associated with a significantly higher proportion of adverse events compared with in-person provision.

MATERIALS AND METHODS

The telemedicine and in-person models of medical abortion provision at Planned Parenthood of the Heartland in Iowa have been previously described.[2] Briefly, women presenting to a Planned Parenthood of the Heartland health center without a physician on-site are evaluated by clinic staff, which includes obtaining medical history, hemoglobin measurement, and performing a focused physical examination and ultrasonography. The off-site physician remotely reviews this information, has a video discussion with the patient, and determines whether she is an appropriate candidate for medical abortion. In general, a patient is not eligible for medical abortion–either in person or by telemedicine–if she has severe anemia, an ultrasonogram that is not diagnostic of an intrauterine pregnancy, or any other standard contraindication to medical abortion.[1] If she is eligible for medical abortion, mifepristone and misoprostol are remotely dispensed. Patients receive routine counseling and follow-up to assess abortion completion. Those who do not return for follow-up after medical abortion are routinely contacted and encouraged to return to the health center. Back-up for uterine aspiration is provided through referral to a Planned Parenthood health center with an on-site physician or to a local physician or emergency department when necessary. During the 7-year period of this study, in-person medical abortion was provided at five sites, and telemedicine services were provided at most at 13 sites in Iowa (including two of the sites that sometimes offered in-person services).

We analyzed the deidentified data on clinically significant adverse events for all medical abortions performed by telemedicine or an in-person visit between July 1, 2008 (shortly after telemedicine was initiated) and June 30, 2015, at Planned Parenthood of the Heartland clinics in Iowa. We used frameworks that have been previously described to investigate the safety of medical abortion.[5,6]

The data we analyzed included the following major adverse events: hospital admission, surgery (not including vacuum aspiration of the uterus), blood transfusion, and death.[6] We also included treatment given in the emergency department, including intravenous fluids or oral medication, which we considered a minor but clinically significant adverse event. Cases that involved an emergency department visit where no treatment was given were not considered an adverse event. If adverse events were clearly not related to the abortion such as a motor vehicle accident, they were not included. We did not include nonserious adverse events treated in an outpatient setting, because these are not reportable (see subsequently). We also did not include cases of ongoing intrauterine pregnancy, because this is a known possible outcome of medical abortion.[1] Women with an incomplete abortion are included here only if they were treated in the emergency department; outpatient treatment of incomplete abortion is not reportable. Similarly, cases of ectopic pregnancy that were diagnosed after starting medical abortion would have been captured only if the patient required hospitalization, surgery, blood transfusion, or treatment in the emergency department. A single patient may have experienced more than one adverse event, and all are reported here. For example, a patient who received a blood transfusion and underwent surgery would be counted in each of these categories but would count as a single case of "any major adverse event."

Several data sources were used to capture this information. The data on total number of medical abortions performed at Planned Parenthood of the Heartland clinics in Iowa by telemedicine or in-person visit during this period were obtained from the clinic system's practice management database. Deidentified data on adverse events came from required reporting forms submitted by the clinics to Planned Parenthood Federation of America. Planned Parenthood staff are trained in accurate and complete reporting of medical abortion-related adverse events, and this reporting is audited by Planned Parenthood Federation of America as part of the accreditation process.[5] The information about medical abortion-related adverse events is collected by clinic staff from a variety of sources, including follow-up visits at the clinic as well as reports from physicians at other clinics or hospitals that are transmitted to Planned Parenthood.[5] Planned Parenthood Federation of America submits the reports on adverse events received from the clinics to Danco Laboratories, the U.S. distributor of mifepristone, in accordance with the mifepristone prescribing agreement. Danco in turn reports them to the U.S. Food and Drug Administration. At the time of the study, prescribers were required to report any hospitalization, transfusion, or other serious event to Danco.[7] The prescribing agreement was updated in

March 2016 and now requires only reporting of death.[8]

To ensure we captured any cases that may not have been filed with Planned Parenthood, we reviewed all reports of adverse events from patients in Iowa reported to Danco during the study period. Most adverse events on file with Danco identified the clinic where the patient received her medical abortion; however, if there was any case that did not specify the clinic, we assumed it was a patient seen at Planned Parenthood of the Heartland because this system provides the majority of abortions in the state. For all reports of adverse events, staff at Planned Parenthood of the Heartland determined whether the patient had a telemedicine or in-person visit by reviewing the practice management database using the medical record number and date of service if the report did not specify that the patient's abortion visit was by telemedicine or in person.

Some women with adverse events may present to emergency departments, and this care may not be reported to Planned Parenthood or Danco as a result of lack of awareness of the reporting requirements. To address this, we conducted a survey of the 119 emergency departments in the state (as reported in the American Hospital Association Annual Survey, which collects comprehensive utilization, financial, personnel, and service data on all Iowa hospitals based on audited financial statements[9]). We mailed the survey along with an informed consent form and a signed letter from the principle investigator to the medical director, manager, or administrator of each emergency department, and we attempted to follow up with nonresponders by telephone. The survey was administered from June to October 2014 and could be completed by mail, online using Survey Monkey, or by telephone. The survey included questions asking whether any women had presented at the emergency department in the prior 12 months with a possible complication of medical abortion, and, if so, how many and whether those cases were reported to Danco; respondents could also respond that they were not sure whether they had seen such a case. Medical abortion was described in the survey as the use of Mifeprex (mifepristone) and misoprostol as an outpatient service to induce abortion, usually up to 9 weeks of gestation, which was the standard gestational age limit in Iowa at the time. We focused the survey on adverse events seen in the prior year to avoid recall bias of events in the more distant past.

We calculated the prevalence and 95% CI for each of the following: any clinically significant adverse event (defined as having at least one major adverse event or receiving treatment in the emergency department), which was the primary outcome; any major adverse event (defined as having at least one major adverse event); and each individual adverse event. CIs were calculated using the binomial method. We also used the χ^2 test to compare telemedicine with in-person patients for each of these adverse event categories. The primary analysis was designed as a noninferiority study aimed to determine whether telemedicine provision was associated with a significantly higher prevalence of adverse events compared with in-person provision. To determine the sample size for the study, we assumed that the prevalence of clinically significant adverse events as defined here would be 0.3% among patients with an in-person visit.[2] We considered that telemedicine provision was inferior to in-person provision if the prevalence were 0.6% or higher (absolute difference of 0.3%). We selected this margin of noninferiority because we felt that a doubling of adverse events was clinically meaningful and because a narrower margin would require an unfeasible sample size. The required sample size was 6,984 in each group (one-sided $\alpha=0.025$, power 90%). All calculations were performed using Stata 12.1. This study was approved by Allendale Investigational Review Board.

RESULTS

During the study period, 8,765 medical abortions were performed with telemedicine, and 10,405 had an in-person visit. A total of 49 clinically significant adverse events were reported among the 19,170 medical abortions at Planned Parenthood of the Heartland clinics in Iowa from July 1, 2008, to June 30, 2015 (0.26% of medical abortions). No deaths or cases requiring surgery were reported, and none of the adverse events involved an ectopic pregnancy. No new cases of clinically significant adverse events were identified from the review of forms filed with Danco, which were identical to those obtained from Planned Parenthood.

Overall, 0.18% of telemedicine patients had any clinically significant adverse event (95% CI 0.11–0.29%), and 0.32% of in-person patients (95% CI 0.23–0.45%) had any clinically significant adverse event. The difference in adverse event prevalence was 0.13% (95% CI −0.01% to 0.28%, $P=.07$), which was within our margin of noninferiority. There was no significant difference in the prevalence of any major adverse event or any individual adverse event between the two groups (Table 1).

Of the 119 emergency departments contacted for the survey, only 42 completed the survey and six

Table 1. Adverse Events After Medical Abortion Among Patients at Planned Parenthood of the Heartland in Iowa, July 2008–June 2015*

	Telemedicine Patients (n=8,765)		In-Person Patients (n=10,405)		
Adverse Event	n	% (95% CI)	n	% (95% CI)	*P*
Any major adverse event or ED visit with treatment	16	0.18 (0.11–0.29)	33	0.32 (0.23–0.45)	.066
Any major adverse event†	8	0.09 (0.05–0.18)	13	0.12 (0.07–0.21)	.483
Hospital admission	6	0.07 (0.03–0.15)	13	0.12 (0.07–0.21)	.216
Transfusion‡	6	0.07 (0.03–0.15)	7	0.07 (0.04–0.17)	.975
ED visit with treatment	13	0.15 (0.09–0.26)	22	0.21 (0.14–0.32)	.308

ED, emergency department.
* Events are not mutually exclusive.
† There were no cases of death or surgery, which are also considered major adverse events.
‡ Transfusion is any blood product transfusion, regardless of the number of units.

declined to participate; responses were not obtained from the remaining 71 emergency departments (overall response rate of 35%). Overall, 34 respondents reported that no women had presented to their emergency department with a possible complication of medical abortion in the previous 12 months, and eight were not sure.

DISCUSSION

Similar to prior research,[2,5,6] this study found a very low prevalence of clinically significant adverse events among patients undergoing medical abortion. In addition, we found that telemedicine provision of medical abortion in this setting was not associated with a significantly higher prevalence of adverse events compared with in-person provision of the service according to our threshold of noninferiority.

After the telemedicine program was launched by Planned Parenthood of the Heartland, the Iowa Board of Medicine passed a regulation prohibiting abortion provision using this technology, citing concerns about safety.[10] Planned Parenthood sued the Board of Medicine, and in June 2015, the Iowa Supreme Court issued a unanimous ruling striking down this restriction, saying that it would have placed an undue burden on a woman's right to access abortion services.[11] Despite this ruling, 18 other states have passed laws prohibiting the use of telemedicine to provide medical abortion.[12] This study demonstrates that concerns about the safety of this service are not substantiated by medical evidence.

The survey of emergency departments is significantly limited and results must be viewed cautiously. The response rate is 35%, so the results must be considered to have significant bias. Additional bias is possible because the emergency department respondents may not have reviewed medical records and relied instead on recall. Also, we surveyed hospitals only in Iowa; some patients traveled from adjacent states for abortion services. Despite these limitations, the fact that none could recall treating a woman with complications after medical abortion suggests that few such cases are treated in the emergency department. A study from California found that 0.87% of patients undergoing abortion presented within 6 weeks of the procedure with an abortion-related complaint and received a related diagnosis or treatment.[6] That study, which also had good information about follow-up treatment because it was based on Medicaid billing data, found that 0.31% (95% CI 0.21–0.41%) of patients undergoing medical abortion had a major complication, which is slightly higher than what we observed in the current study.

There was no statistically different rate of adverse events among women who had an in-person visit for medical abortion. Our findings contrast with other studies indicating that U.S. rural residents are more likely to be hospitalized for conditions such as injury or depression compared with urban residents.[13,14] More research is needed to understand rural–urban differences in care-seeking for and management of postabortion complications in the United States.

This study has several limitations in addition to those of the emergency department survey. Some adverse events may not have been reported if the treating clinician was unaware of the reporting requirement and did not contact Planned Parenthood. It is unlikely that patients receiving telemedicine services would be more likely to have unreported adverse events, especially given the press coverage of the service that occurred after its launch. In addition, we do not have demographic information about all of the patients undergoing medical abortion to identify risk factors associated with having an adverse event. Finally, the findings of this study are specific to the telemedicine model implemented in Iowa and may

not be generalizable to different models such as those that do not use strict eligibility criteria or involve a clinic staff person evaluating the patient at the remote site. A strength of the study is its large sample size, which allows sufficient power to study these rare outcomes, as well as the noninferiority design.

In the 2 years after telemedicine was introduced at Planned Parenthood of the Heartland clinics, women had an almost 50% higher adjusted odds of obtaining a first-trimester abortion instead of a second-trimester abortion compared with the 2 years before telemedicine.[4] Second-trimester abortion is associated with a higher risk of complications compared with first-trimester abortion, and it is also more expensive for patients.[15,16] Rather than increasing risks of abortion, it may be that telemedicine provision of medical abortion helps to reduce such risks by improving access to early abortion. An evidence-based approach to women's health policy should include the use of telemedicine in settings with limited access to in-person care, because it is associated with similar effectiveness as with in-person care with no increase in adverse events.

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