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Original Research Article

Implementation of telemedicine preoperative visits for abortion procedures through 18 weeks gestation at a Northern California hospital-based center ☆☆☆

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ABSTRACT

Objective: Describe the implementation of a preoperative telemedicine program at a Northern California hospital-based center for abortion procedures requiring cervical preparation.

Study Design: We implemented a pilot program using telemedicine for preoperative visits for patients needing cervical preparation prior to an abortion procedure from 12 to 18 weeks. We required ultrasonography for gestational age documentation in addition to placental localization in patients with a prior cesarean delivery. We prescribed misoprostol for cervical preparation for patients undergoing the telemedicine preoperative visit; in-person preoperative visits typically involve placement of osmotic dilators. Secondly, we surveyed patients who had telemedicine and in-person preoperative visits to compare their preoperative experiences.

Results: Implementation required 8 months of multidisciplinary meetings. From March 2018 through March 2019, we received 200 abortion referrals at 12 to 18 weeks gestation. Of these 200 patients, 119 did not meet telemedicine eligibility criteria, most commonly due to inability to obtain required ultrasonography ($n = 89$ [75%]). Of the remaining 81 patients, 43 scheduled telemedicine visits of which 41 initiated and 38 (88%) completed the visits. Twenty-one (55%) telemedicine encounters had no or minor technical difficulties. Thirty-one of 34 (91%) telemedicine and 91 of 108 (84%) in-person visit patients expressed high satisfaction with their preoperative appointment ($p = 0.4$); none reported dissatisfaction. Patients chose the telemedicine visit primarily for convenience and transportation concerns.

Conclusion: A multidisciplinary team is essential for the successful implementation of a preoperative telemedicine program for procedural abortion care. Patients reported high satisfaction and reduced logistical burdens with the telemedicine option.

Implications: Telemedicine preoperative visits for abortion procedures at 12 to 18 weeks gestation may improve access to abortion care, reduce patient burdens, and provide an alternative encounter option which may improve the patient experience.

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1. Introduction

In 2014, 90% of counties in the United States lacked an abortion provider and one-third of patients obtaining abortion care travelled more than 25 miles one way to reach a facility [1,2]. These distances commonly require logistical coordination and unavoidable financial burdens for transportation, overnight local accommodation, childcare, and time away from work or school resulting in ac-

cess difficulties. Additionally, abortion care often involves multiple visits due to state-mandated waiting periods, consent processes, ultrasound dating, and laboratory evaluations. Moreover, with advancing gestation, some patients also require an additional visit for cervical preparation.

Telehealth has the capacity to reduce access barriers and improve patient experience by decreasing logistical, time, and financial burdens. Telemedicine provides medical consultations with outcomes comparable to in-person treatment for a variety of specialties and is beneficial for perioperative care [3–5]. In a study assessing preoperative visits for incarcerated persons undergoing maxillofacial surgery, telemedicine was as reliable and cost-effective as in-person visits [6,7]. For abortion care specifically,

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telemedicine has been used to eliminate in-person visits for medication abortion [8–10] and obtain informed consent in states with mandatory waiting periods [11]. A recent systematic review of telemedicine for medication abortion found it acceptable to patients and providers and demonstrated similar success rates and safety outcomes [12]. The use of telemedicine for medication abortion and non-abortion perioperative care is well documented in the literature, yet data supporting telemedicine for procedural abortion care is lacking.

Since cervical preparation for abortion care up to 18 weeks can be completed pharmacologically without the need for an in-person procedure, we determined that telehealth services could be expanded to include this patient population, particularly in pandemic situations.

The purpose of this study is to describe the development and implementation of this pilot program and to learn from the clinical experience of both the clinicians and patients. We hypothesized that the majority of patients who chose to have a telemedicine preoperative appointment would complete the telemedicine encounter and have an abortion procedure as scheduled, demonstrating feasibility of this program. Additionally, we hypothesized that patients would choose telemedicine to reduce logistical obstacles and would overall report a positive experience.

2. Materials and methods

We designed a telemedicine preoperative evaluation program for patients needing cervical preparation prior to an abortion procedure between 12 weeks 0 days and 18 weeks 0 days gestation. Our institution, located in Northern California, is a hospital-based program that serves as both a primary abortion provider and a tertiary referral center. We used our electronic medical record (EMR) platform application (Epic MyChart) for video visits. Our institution lacked remote electronic signing of procedural consents via DocuSign or similar platforms; therefore, we developed a secure system to electronically send consent forms to patients prior to the visit.

Once our team had all program components in place, we offered the telemedicine option to patients between 12 weeks 0 days and 18 weeks 0 days gestation by ultrasonography who had video capacity, no medically significant health issues requiring in-person assessment, and ultrasound placental characterization if prior cesarean delivery. We used 18 weeks 0 days gestational age limit based on standard practice for pharmacologic-only cervical preparation at our institution during the study period. We offered telemedicine visits to patients from referring clinics that sent interpretable ultrasound images confirming gestational age. If a patient at 14 weeks or more gestation had a prior cesarean delivery, we required a radiology ultrasound examination with placental location and characterization in accordance with our standard practice. Our clinic practice prior to this telemedicine program involved an in-person preoperative visit the day before the planned procedure and almost always included placement of osmotic dilators for cervical preparation.

If the patient agreed to the telemedicine option, our clinical staff (usually the Complex Family Planning fellow) securely emailed instructions about the telemedicine visit, clinical care information including instructions for misoprostol use, and personalized surgical consent forms. Patients printed their consent forms prior to the appointment and had them ready for review and signature. Our Center for Health and Technology team and Informational Technology department called all patients prior to their scheduled video appointment to make sure they had all necessary applications. This same team was available during the scheduled appointment to address real-time technological issues.

A combination of Complex Family Planning fellows and faculty conducted the telemedicine visits. Patients used their personal device, such as a phone, tablet, or computer, from a remote location. We created templates within the EMR for visit documentation nearly identical to in-person visits. After counseling and obtaining consent, the patient signed the consent forms and returned them via fax or email. The physician who conducted the video appointment printed and signed the form and scanned it into the EMR. The physician sent misoprostol for cervical preparation and routine medication prescriptions electronically to the patient's pharmacy of choice. Physicians instructed patients to place misoprostol 400 mcg vaginally 3 to 4 hours prior to their planned procedure, which the physician scheduled as one of the first procedures of the surgical day. Upon arrival to the preoperative area, the care team performed standard laboratory testing (e.g., type and screen, blood count) and ultrasonography to confirm gestational age if the patient had not had a prior scan by a radiologist or a faculty member from our Family Planning division.

We approached patients between 12 weeks 0 days and 18 weeks 0 days gestation in the preoperative area, prior to their abortion, to answer structured questions if they had completed a preoperative visit either in-person or through telemedicine and had cervical preparation with misoprostol or osmotic dilators. After obtaining informed written consent, study staff asked structured questions (Appendix) to confirm demographics and health histories as listed in the EMR and to explore the logistical planning efforts for their preoperative and procedural appointments including questions about travel, accommodation, childcare, and time away from work or school. We also asked questions related to their overall preoperative experience and satisfaction. If they had a telemedicine visit, we asked additional questions about video and audio quality, ease of use, and if they would choose this option again or recommend to a friend. We obtained University of California, Davis Institutional Review Board approval for the patient experience surveys.

The primary objective of our study was to assess successful implementation of this program measured by the ability to complete preoperative telemedicine visits for eligible and interested patients as well as the completion of their abortion procedure. We obtained needs assessment data through telemedicine eligibility criteria and tracking of reasons for ineligibility. The physician and assigned research staff recorded the duration and location of the telemedicine visits, along with technical and non-technical interruptions. For analyses, we defined minor technical difficulties as less than 5 brief interruptions and major technical difficulties as greater than 5 technical interruptions, significantly delayed appointment, or need for rescheduled telemedicine visit. We developed these definitions based on telehealth expert opinion and group experience. We compared survey responses between groups using Fisher's exact, chi-square, and student's *t* tests for categorical and continuous variables, as appropriate.

3. Results

3.1. Program development and implementation

Development and implementation required 8 months of multidisciplinary meetings with our Center for Health and Technology experts, legal officers, financial, billing, compliance, administrative, clinical and research personnel. We initially planned to use satellite clinic portals but liability concerns prompted development of a system for patients to use a personal video-capable device to conduct the appointment directly with the physician team.

The most significant barrier to efficient program utilization was establishing an institutionally-approved method for signing consents electronically. Originally, we planned to use a validated se-

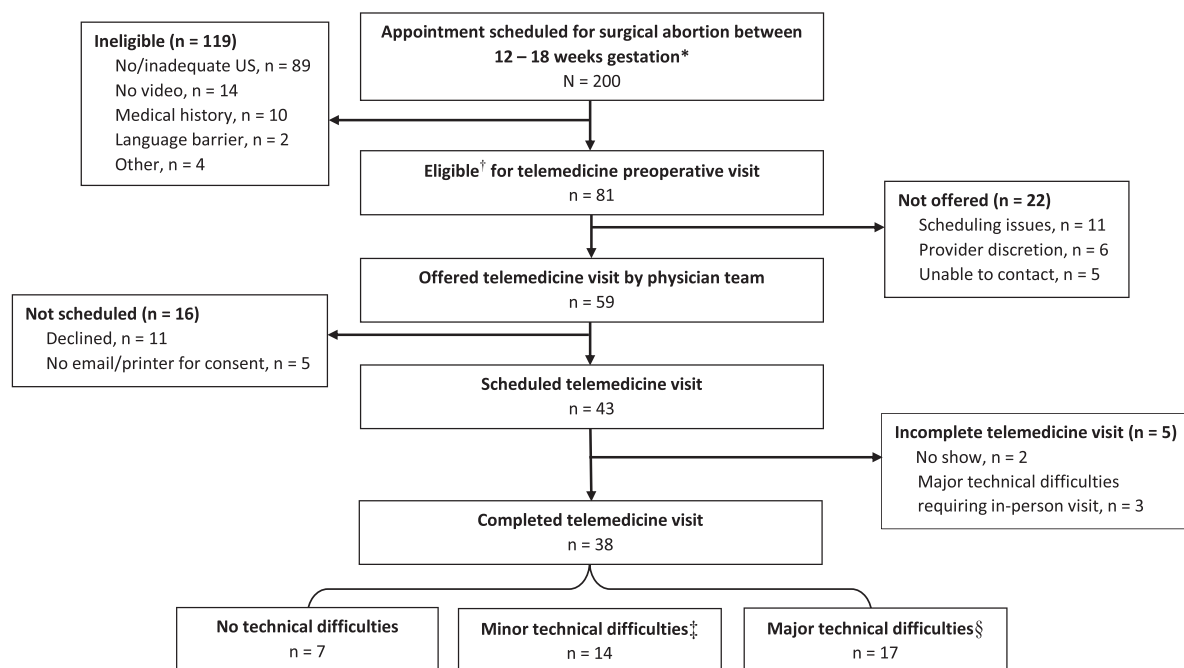


Fig. 1. Title: Clinical flowsheet for implementation of telemedicine preoperative evaluations prior to abortion procedure between 12 and 18 weeks gestation demonstrating eligibility, scheduling, and completion of telemedicine visits. Footer: US = ultrasound * Pharmacologic cervical preparation routinely used for 12 to 18 weeks if vaginally nulliparous and 14 – 18 weeks if vaginally parous. † Eligibility determined by clinical team via chart review and conversation with physician; includes prior ultrasound examination confirming gestational age between 12 and 18 weeks on day of planned procedure, localization and characterization of placenta in patients with history of prior cesarean delivery, no medically significant health issues that require in-person preoperative assessment, and video conferencing capacity. ‡ Minor technical difficulties defined as less than 5 brief technical interruptions. § Major technical difficulties defined as more than 5 technical interruptions, significant delay in appointment time, or need to reschedule appointment due to technical issues.

cure remote electronic signature platform, such as DocuSign and Epic e-signatures, but our institutional contract excluded patient care-related consenting so those models could not be used. Instead, our team developed a system to rely on a combination of secure email, standard mail, and photography to send, sign, and receive the consents during the telemedicine encounter.

Technology updates triggered adaptation to a new system by both patients and providers. Initially, the provider connected using Epic Warp drive, a secure live video conferencing software only available on desktop computers, while the patient could use either a computer or phone to log into their MyChart account. Five months after initiating the program, the provider switched to connecting through an i-Device while the patient could only use the MyChart application on their phone (i-Phone or Android). Also, an Epic update caused a 10-day system downtime requiring 2 patients to reschedule as in-person visits.

3.2. Telemedicine visits

From March 2018 to March 2019, 200 patients scheduled a preoperative appointment for an abortion procedure between 12 and 18 weeks 0 days gestation. Of these, 81 (41%) were initially eligible for a telemedicine preoperative appointment. Figure 1 outlines the eligibility and scheduling process. Of the 119 ineligible patients, lack of adequate ultrasound documentation was the largest contributing factor ($n = 89$ [75%]) and included a combination of no ultrasound confirmation of gestational age, verbal or written fetal biometrics from an outside clinic without ultrasound images for visual confirmation, poor quality images that were uninterpretable, or the absence of placental characterization in the setting of a prior cesarean delivery. Only 14 (20%) of the 59 referral patients with prior cesarean delivery had a documented placental location.

We successfully completed 38 (88%) of the 43 scheduled telemedicine appointments. Two scheduled patients did not keep

their appointment and the other 3 patients had major technical difficulties (2 related to the Epic update mentioned previously) that required rescheduling to an in-person appointment to avoid delaying their procedure. None of the patients who underwent telemedicine preoperative evaluation had their procedure rescheduled due to unidentified health issues requiring additional evaluation or due to misunderstanding the surgical process.

The median duration of completed telemedicine visits was 41 minutes (range 25–91). Reported location at time of telemedicine visit included home (62%), work (15%), car (18%), and other (6%), which included camping or at a relative's home. Of the 38 completed telemedicine visits, 7 (18%) had no technical difficulties, 14 (37%) had minor technical difficulties, and 17 (45%) had major technical difficulties. Ten (26%) experienced environmental interruptions, most of which involved children walking into the room or needing attention.

3.3. Survey outcomes

Thirty-four patients who had a telemedicine preoperative visit and 108 patients who had an in-person visit participated in the survey prior to their procedure; patient characteristics are presented in Table 1. Twenty-one (62%) telemedicine and 14 (13%) in-person patients reported coordinating “nothing” for their preoperative appointment ($p < 0.0001$). The 108 in-person patients reported the need to coordinate transportation (50 [46%]), time away from work and/or school (50 [46%]), childcare (45 [42%]), and accommodation (7 [7%]) to attend their appointment (multiple responses allowed). Table 2 reports the reasons telemedicine patients chose to have their preoperative appointment via telemedicine, which primarily related to convenience and transportation or distance concerns. Thirty-two (94%) telemedicine patients assessed overall ease of encounter as either extremely or moderately easy. Both groups expressed satisfaction with their preoperative ap-

Table 1

Demographic characteristics of patients seeking abortion procedure at 12 to 18 weeks gestation requiring cervical preparation and completing a survey about their preoperative visit experience.

	Telemedicine n = 34	In-person n = 108	p-value
Age (y)	30.3 ± 5.8	28.9 ± 6.1	0.24
Gestational age (d)	110 ± 9	109 ± 6	0.94
Indication for procedure			
Induced	19 (56%)	91 (84%)	< 0.001
Anomaly	12 (35%)	6 (6%)	
Fetal demise	3 (9%)	11 (10%)	
Race			
White	23 (68%)	59 (55%)	0.40
Black	5 (15%)	18 (17%)	
Other	6 (18%)	31 (29%)	
Hispanic ethnicity	9 (26%)	33 (31%)	0.83
Parous	26 (77%)	82 (76%)	0.55
Prior cesarean delivery (parous) ^a	16 (62%)	43 (52%)	
Prior abortion	19 (56%)	49 (45%)	0.33
Highest level of education			
High school or less	8 (24%)	45 (42%)	0.04
Some college/vocational	14 (41%)	44 (41%)	
College or more	12 (35%)	18 (17%)	
Distance from home to hospital ^b (miles)			
< 25	17 (50%)	66 (61%)	0.33
25–49	8 (24%)	15 (14%)	
50–99	7 (21%)	17 (16%)	
≥ 100	6 (18%)	10 (9%)	

All data presented as n (%) or mean ± standard deviation.

p-values calculated by t test, Fisher's exact, or chi-square analysis.

^a Percentage calculated with denominator of parous patients.

^b Distance calculated using Google maps from reported home zip code to hospital zip code.

Table 2

Reasons patients seeking abortion procedure at 12 to 18 weeks gestation requiring cervical preparation chose to have their preoperative appointment via telemedicine (n = 34).

Convenience or ease	22 (65%)
Distance or transportation	16 (47%)
Work or school obligations	5 (15%)
Privacy	4 (12%)
Cost or finances	2 (6%)
Childcare issues	1 (3%)
Other ^a	8 (24%)

All data presented as n (%).

Patients could choose more than one option.

^a Other included no dilators (n = 3), could not come in for in-person appointment (n = 2), try something new (n = 1), better physicians at the referral site (n = 1), and emotional reasons (n = 1).

pointments, with 31 (91%) of the telemedicine and 91 (84%) of the in-person patients being “highly satisfied” (p = 0.5); none reported dissatisfaction. All patients completing the telemedicine visit would choose a telemedicine visit for medical care again in the future and would recommend this to a friend or family member. All responses to the structured survey are included in an online Appendix.

4. Discussion

We successfully developed and implemented a telemedicine program for preoperative evaluations prior to abortion procedures requiring cervical preparation between 12- and 18-weeks gestation. Although technical and non-technical interruptions occurred, we completed the majority of scheduled telemedicine visits and all patients had their abortion procedure as scheduled. We did not ask if

patients perceived the non-technical interruptions as problematic; however, the high satisfaction responses suggest this may not have been an issue.

The development and maintenance of this telemedicine program required a multidisciplinary team to overcome technological and institutional barriers. Implementation was highly dependent on institutional practices, technology, support, and leadership. Highly motivated telemedicine champions were essential for programmatic success. Our primary technology issue centered around the lack of a streamlined remote electronic consent. Although we created an alternative process, it had limited functionality and added technological burden to both patients and providers. If others plan to implement similar programs and written consent is required before the patient physically presents for the procedure (e.g., if pharmacologic cervical preparation is initiated with misoprostol or another treatment), remote electronic consents would dramatically improve the ease of the program.

Not every patient was eligible or interested in the telemedicine option, but 38 (19%) of our 200 patients over an approximately one-year period completed their preoperative visit via telemedicine, i.e., 1 in 5 patients avoided an in-person visit. In the times of COVID-19 or any other pandemic, every effort to reduce clinic visits and potential exposures is valuable. The COVID-19 pandemic has urged rapid expansion of telehealth programs across all medical specialties including essential reproductive health services and abortion care [13–15].

Overall, patients responded positively to our assessments of the telemedicine option. Over 90% of the patients completing a telemedicine preoperative visit reported high satisfaction, although we realize a ceiling effect may exist as many patients receiving compassionate and timely abortion care often report positive satisfaction scores [16]. The telemedicine option reduced some logistical burdens as reflected by the difference seen in those who coordinated “nothing” for their preoperative appointment. Those who chose the telemedicine option primarily did so due to convenience and ease or transportation and distance concerns. Another potential benefit of a telemedicine preoperative option could be a more private and comfortable experience [17]. Exploration of this concept was beyond the scope of our pilot program, but future in-depth qualitative interviews on the privacy of telemedicine preoperative visits would add to existing literature centered around telemedicine medication abortion [18–22]. Assessment of patient comprehension and retention of procedural information may also highlight important differences or similarities between telemedicine and in-person preoperative visits, although we assume results would be comparable to other surgical specialties that have demonstrated adequate consent comprehension [23,24].

Limitations of this study include limited applicability of our findings to other institutions due to the large contributing influences of environment, infrastructure, and individuals involved. Our relatively small numbers limit the statistical analysis for several of our survey questions.

Although we encountered institutional and technological challenges during expansion of our institution's telemedicine program to include abortion procedures, our group and our patients found this option both feasible and valuable. Implementing alternative forms of providing health care is of utmost importance to improve access to essential reproductive health services, including abortion care.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.contraception.2022.06.001.

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