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Comparison of maternal and neonatal outcomes for patients with placenta accreta spectrum between online-to-offline management model with standard care model

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ABSTRACT

Objective: Online-to-offline is a new model for emergent medical service with the ability to connect care providers with patients on instant basis. This study aims to evaluate maternal and neonatal outcomes in patients with placenta accreta spectrum managed by an online-to-offline care model.
Methods: Starting from January 1, 2015, management of patients with placenta accreta spectrum was changed from standard care model into an online-to-offline care model through "Wechat" in Guangzhou Medical Centre for Critical Obstetrical Care. This study compared maternal and neonatal outcomes in patients affected by placenta accreta spectrum between 2015 (online-to-offline model) and 2014 (standard care model).
Results: A total of 209 cases of placenta accrete spectrum were treated in our center in 2015 and 218 such cases were treated in 2014. Patients treated in 2015 had lower rate of hysterectomy (14.83% versus 20.64%) and shorter hospital stay (7 days versus 8 days). The average interval from admission to emergency cesarean section for critically ill patients was 38.5 min in 2015 versus 50.7 min in 2014.
Conclusion: Patients affected by placenta accreta spectrum managed by online-to-offline care model have reduced risk of hysterectomy, shorter hospital stay, and shorter response time from admission to emergency cesarean section.

Introduction

Online-to-offline (O2O) has become a popular business model in China in recent years. It is a business strategy that based on Internet draws potential customers from online channels to physical stores. However, the O2O model for medical service has been rarely reported. O2O seems an attractive model for emergent medical services because of the instant connection between care providers and patients. In this study, we used the social media app of "Wechat" as the communication platform in an O2O care model. "Wechat" has become a popular instant messaging service app in China which has reached 800 millions of people worldwide according to the latest statistics. Persons registered in a "Wechat" group can communicate instantly through text, voice, photos or video.

Placenta accreta, including the spectrum of placenta accreta, increta, and percreta, is one of the greatest management challenges in modern obstetrics [1]. Obstetricians may be faced with a sudden obstetric hemorrhage of placenta accreta at anytime during pregnancy. With the severe morbidity and increasing incidence, attentions have been paid to improve maternal outcomes in these patients. Several surgical technics have been developed to minimize blood loss [2,3]. However, researches on the management and fellow-up for outcomes were limited [2–4]. In this study, we compared maternal and neonatal outcomes in

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patients affected by palcenta accreta spectrum managed by the O2O model with patients managed by standard care.

Materials and methods

This retrospectively cohort study was approved by The Research Ethics Board of the Third Affiliated Hospital of Guangzhou Medical University, Guangdong, People's Republic of China. This study was based on clinical auditing and no formal ethical application and written informed consent from participants were required. Patient records/information were anonymized and de-identified prior to analysis.

Prior to 2015, patients affected by placenta accreta spectrum and seen in our outpatient clinics were managed by standard care model. Specifically, in the standard care model, after a diagnosis of placenta accreta spectrum or suspected placenta accreta spectrum, the patients were instructed to go home to monitor by themselves. If hemorrhage or adverse symptom occurred, the patients were instructed to go to hospital for emergent medical care. If the patient had no bleeding or other adverse symptom during the pregnancy, they just had regular prenatal visits and assessment for pregnancy termination at 34–36 weeks of gestation.

Since January 1, 2015, our center adopted an O2O model to manage placenta accreta spectrum patients. In this new O2O model, once the diagnosis of placenta accreta spectrum or suspected placenta accreta spectrum was made, the patients were registered with a "Wechat" group titled "placenta accreta follow-up group". Once registered in the "Wechat" group, the patient became one of O2O follow-up member and managed by our team of specialists on 24/7 basis. During pregnancy, patients could consult the doctor instantly by talking or sending text, picture, or video if bleeding or other adverse symptom occurred. Based on the conversations with patients, the contact doctor could make the treatment plan. If emergency cesarean section was necessary, multidisciplinary team could be triggered. If no bleeding or other adverse symptom during the pregnancy, they just had routine prenatal visits and assessment for pregnancy termination at 34–36 weeks of gestation (Fig. 1).

In this study, we compared maternal and neonatal outcomes in patients affected by placenta accreta spectrum in 2015 (the year with O2O model of care) and those in 2014 (the year with standard care). No change in medical staff or facility or patient care policy (except the O2O model) occurred in our team in these two years. Placenta accreta spectrum was diagnosed according to antenatal imaging examination, medical history, confirmation during delivery that the placenta could not be removed, and pathological examination of the hysterectomy sample [5].

Maternal outcomes considered in this study were hysterectomy, blood loss, transfusion, uterine rupture, infection, shock, sepsis, ICU transfer, length of hospital stay, ICU stay, and maternal death. Neonatal outcomes considered in this study were intrapartum stillbirth, fetal death, fetal distress, 1 min Apgar score <5, 5 min Apgar score <7, neonatal asphyxia and neonatal death.

We first compared the baseline demographic and clinical characteristics for all patients with placenta accreta spectrum between 2014 and 2015. We then compared maternal and neonatal outcomes between the two groups. For critically ill patients who required an emergent hospitalization or surgery, time interval between home to admission and time interval from admission to operation between the two groups were further compared. All data were analyzed using SAS 9.4 (SAS Institute, Cary, NC, USA). Continuous variables were described using mean $\pm$ SD or median (range) where appropriate and compared using *t*-test or Nonparametric tests. Categorical data were described using frequency (percentage) and compared using chi-squared or Fisher's exact tests where appropriate. The length of hospitalization and length of ICU stay were analyzed with COX regression of survival analysis to calculated hazards ratio (HR), adjusted hazards ratio (aHR) and

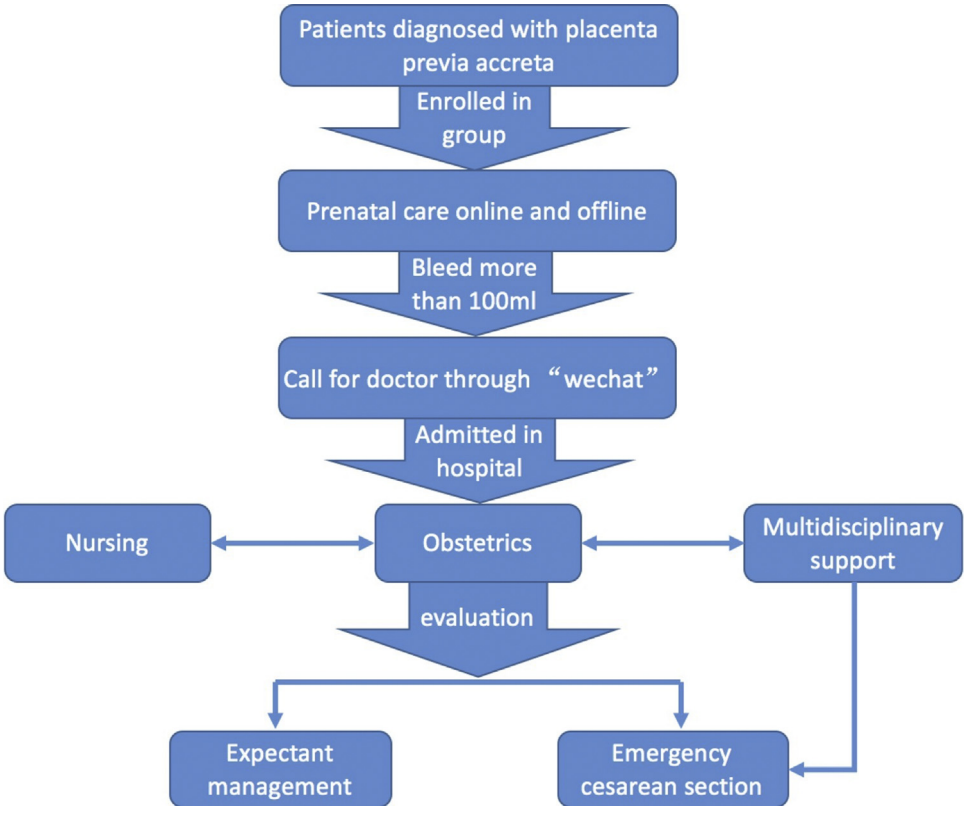

Fig. 1. O2O model management loop in placenta accreta spectrum patients.