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Retrospective Cohort Study
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COVID-19 Pandemic Sequelae: The Impact on Ectopic Pregnancy and Management

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Abstract

The COVID-19 pandemic was associated with an increase in ectopic pregnancy rates and need for surgical management with higher acuity patients.

Keywords: Ectopic Pregnancy; Pandemic; COVID-19; *Chlamydia*; *Gonorrhea*, Health Maintenance; Telemedicine; Sexually Transmitted Infection; Virtual

Introduction

Since the emergence ofthe COVID-19 virus in December 2019, healthcare hastransformed dramatically. One beneficial change was the adoption of telemedicine, allowing for continuity of healthcare provision while decreasing in-person contactby 80% [1]. Although the adaptation of remote medical care has been advantageousin reducing COVID exposures, concerns were raised regarding the quality of other forms of care delivered during the pandemic – particularly regarding preventative medicine and recommended screening aspects of healthcare. Specifically for OB/GYNs, there are data showing reductions inroutine screenings for asymptomatic sexually transmitted diseases during the pandemic, which could result in missed diagnoses and progression of disease [2]. Given that *Gonorrhea*and *Chlamydia* are known risk factors for ectopic pregnancies, it is plausible that risk of developingpelvic inflammatory disease and subsequent ectopic pregnancies increased during the pandemic with a decrease in asymptomatic screening [3,4]. Since ectopic pregnancies canevolve into medical emergencies requiring rapidsurgical intervention, this could lead to downstream effects including increase strain and demand on both emergency and surgical departments. The primary aim of this study was to assess the rate of ectopic pregnancies coinciding withtheCOVID-19 pandemic. The secondary aim was to assess the management of these ectopic pregnancies due to concern for delayed clinical presentation.

Materials and Methods

This retrospective cohort study evaluated the number of ectopic pregnancies and management strategies for a single tertiary care academic medical center. The study received institutional IRB exemption.The number and management strategies for ectopic pregnancies from March 1st, 2019 to February 29th, 2020 (pre-pandemic)werecompared to the ectopic pregnanciesfrom October 1st, 2020 to September 30th, 2021 (post-pandemic). Given the unknown incidence of pregnancy during this time period, initial prenatal visits were used as surrogate denominators to determine the rate of ectopic pregnancy during both time periods. Billing diagnosis codes and review ofall surgical cases were additionally reviewed utilized for ectopic pregnancy identification. Data for each subject included the diagnosis of ectopic pregnancy, quantitative β-hCG level at time of diagnosis, presence of free fluid on ultrasound at the time of diagnosis, and whether surgical or medical management was performed.

Results and Discussion

In the pre-pandemic phase, 54 ectopic pregnancies were diagnosed among 3,317 initial prenatal visits as compared to 66 ectopic pregnancies among 2,328 initial prenatal visits in the post-pandemic phase (p=0.0485) as noted in Table 1. At the time of ectopic pregnancy diagnosis in the post-pandemic phase, 50 patients had free fluid noted on ultrasound compared to 26 patients in the pre-pandemic phase, which was statistically significant (p=0.0005) as displayed in Table 2. The rate of surgical management in the post-pandemic group was 77.8% *vs.*61.1% in the pre-pandemic group, which was also statistically significant (p=0.0143). These data points were additionally examined using an odds ratio to explore more details on the relationship between intervention and pandemic phase. The odds of receiving MTX treatment during pre-pandemic phase was 4 times higher as the odds

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Table 1: Phase by ectopic.

Phase	Ectopic Pregnancy		
	Yes	No	Total
Pre-COVID	54	3263	3317
Post-COVID	66	2772	2838
Total	120	6035	6155
p-value	0.045		

Table 2: Phase by free fluid.

Phase	Presence of Free Fluid		
	Yes	No	Total
Pre-COVID	26	3291	3317
Post-COVID	50	2788	2838
Total	76	6079	6155
p-value	0.0005		

in post-pandemic phase (OR: 4, 95% CI: 1.44-11.14). Additionally, while the initial β-hCG at identification of ectopic pregnancy was not significant, there was a trend towards a higher β-hCG at diagnosis, with a mean of 5,738mIU/mL in the pre-pandemic phase versus 6,955mIU/mL in the post-pandemic phase (p=0.572).

These data show a significantly higher number of ectopic pregnancies in the post-pandemic era than prior, specifically when considering the overall number of initial prenatal visits during those time periods. Additionally,patients were more likely to receive medical management during the pre-pandemic phase than the post-pandemic phase, and the surgical rate of ectopic pregnancies was increased in the post-pandemic phase. This corresponds with patients with ectopic pregnancies presenting with free fluid within the pelvis, whichtypically willpreclude medical management. Based on this, patients may have presented to care later and with increased signs of rupture necessitating surgical over medical management in the post-pandemic phase. This could be potentially attributed to decreased in-person healthcare access, or even the personal desire to avoid healthcare systems during the pandemic. Regardless of the cause, increased rates of surgical management and presentation of higher acuity patient's placesstrain the healthcare system due to increased resource utilization in both emergency and surgical departments.

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