TheGMS
The Gazette of Medical Sciences
https://www.thegms.co ISSN 2692-4374 DOI https://www.doi.org/10.46766/thegms

Public Health | Research

COVID-19 and the surge in Decidual Cast Shedding

Tiffany Parotto[1], James A. Thorp[2*], Brian Hooker[3], Paul J. Mills[4], Jill Newman[5], Leonard Murphy[6], Warren Geick[7], Dan McDyer[8], Raphael B. Stricker[9], Sue Peters[10], Maureen McDonnell[11], Heather Ray[12], Christiane Northrup[13]

[1]Director and Founder of MyCycleStory℠, Research Analyst, St Petersburg, FL
[2]Department of Ob/Gyn, Division of Maternal Fetal Medicine, SSM Health, St. Louis, MO
[3]Chief Scientific Officer, Children's Health Defense, Franklin Lakes, NJ
[4]Professor, Family Medicine and Public Health, University of California, San Diego, La Jolla, CA
[5]Biostatistician, Mount Pleasant, SC
[6]Research Advisor, Atlanta, GA
[7]Research Data Analyst, Austin, TX
[8]Private Practice Obstetrician/Gynecologist, Jacksonville, FL
[9]Union Square Medical Associates, San Francisco, CA
[10]Research Fellow, Children's Health Defense, Franklin Lakes, NJ
[11]BSN, Barnardsville, NC
[12]Science and Research Assistant, Children's Health Defense, Franklin Lakes, NJ
[13]Former Fellow of the American College of Obstetrics and Gynecology, Former Assistant Clinical Professor of Ob/Gyn U of Vermont College of Medicine, Portland, ME

Submitted: 14 April 2022
Approved: 20 April 2022
Published: 21 April 2022

Address for correspondence:
James A. Thorp, MD, Department of Ob/Gyn, Division of Maternal Fetal Medicine, SSM Health, St. Louis, MO

How to cite this article: Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107- 117. https://www.doi.org/10.46766/thegms.pubheal.22041401

Abstract

Background: The purpose of this study is to report on the unprecedented rise in decidual cast shedding (DCS) that occurred in 2021. DCS is historically a rare gynecological event, with less than 40 cases reported in the medical literature over the last 109 years. Previous journal articles on DCS were usually case studies; population prevalence data is non-existent.
Methods: The MyCycleStory℠ survey was distributed via social media from May 16th, 2021, through December 31, 2021. The total sample size for analysis was 6049 with 89.1% of the participants responding within the first 3.5 months of the 7.5 months duration of the study. In parallel to the survey study, a Google Trends search was completed for search frequencies of relevant keyword terms including "decidual cast" and "decidual cast covid vaccine."
Results: In the survey, 292 women (4.83 % of the sample) reported having experienced DCS. The mean age of these predominantly non-Hispanic white women was 36.1 ± 0.5 (SEM) years. Eleven percent were taking hormonal contraceptives, 94.3% considered themselves healthy and 96.2% reported that menstrual irregularities started in 2021. According to Google metadata, search terms for "decidual cast shedding" substantially increased during the months of April, May, and June 2021. These peaks in searches represented a 2000% increase over the first quarter of 2021.
Conclusions: There was a significant increase in self-reported DCS in the latter part of 2021 compared to all pre-pandemic cases. More research is urgently needed to investigate the factors contributing to DCS in 2021 and whether this trend is continuing.

Keywords: Decidual Cast Shedding, COVID-19 pandemic, COVID vaccine adverse reactions, spike protein shedding, menstrual abnormality

Introduction

The COVID-19 pandemic expanded recognition and discussion across social media sites of a variety of symptoms related to SARS-CoV-2 infection and side effects related to COVID-19 vaccines. After the distribution of the COVID-19 vaccines specifically, there was a marked increase of women sharing irregular menstruation experiences on a variety of social media platforms, and a few formal surveys were conducted. One survey launched

*Hyperlink to Patient Testimonials of Respondents in MyCycleStory℠
https://www.thegms.co/publichealth/pubheal-ra-22041401-Patient-Testimonials-MyCycleStory.pdf

Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107-117. https://www.doi.org/10.46766/thegms.pubheal.22041401

in April 2021 had more than 150,000 respondents [1]. The survey was limited because it did not differentiate between specific symptoms, length, or severity of symptoms, nor did it address potential causes. The survey indicated that menstrual irregularities increased exponentially starting in 2021.

To follow up those findings and gather a wider array of general and menstruation-related symptom data, a new user-centered survey, the MyCycleStory℠ survey, was designed and disseminated [2]. As survey submissions accumulated, it became clear that individuals were reporting a variety of unusual symptoms, many severe. One such rare symptom was the passage of decidual casts, also known as decidual cast shedding (DCS). Some of the respondents provided detailed descriptions of their experiences. A subset of these testimonials is included in the below hyperlink [26].

A decidual cast may occur when the cessation of progesterone levels results in loss of support for the decidualized endometrial lining [3]. This results in a synchronized detachment of the entire decidualized layer of endometrium, and it passes from the uterus through the cervix and vagina. This tissue mass/clot is often triangular, consistent with the internal shape of the intrauterine cavity (Figure 1). Other less common causes of DCS include cessation of exogenous estrogen/progesterone therapies, and use of oral contraceptives and injectable progesterone [4].

The purpose of this study is to share the unprecedented occurrence rates of DCS reported by the MyCycleStory℠ survey respondents. DCS is a rare gynecological event as evidenced by less than 40 cases published in the medical literature over the last 109 years [3-18]. Because previous journal articles about DCS are case studies, the medical literature cannot determine a reliable prevalence of DCS events.

Materials & Methods

With the support and consultation of gynecologists, the MyCycleStory℠ survey was designed to capture demographic, lifestyle, and clinical data through a secure online survey. The survey, containing 91 questions, targeted all women 18 years of age and older, COVID-19 vaccinated and unvaccinated, who were experiencing menstrual anomalies. The survey focused on SARS-CoV-2 spike protein exposure through infection or vaccination, as well as demographic information, medications, supplements, stress levels, exposure to hazardous agents and other indicators for sudden menstrual irregularities. We obtained survey responses by sharing the survey information via crowdsourcing to female participants on social media beginning on May 16th, 2021. We closed the collection of data for this initial study on December 31, 2021. This study had a total sample size of 6049, with 89.1% of the participants responding within the first 3.5 months.

The user-centered survey design was based in part on symptoms that were being reported through social media testimonials, covering menstrual-related irregularities. Survey respondents were asked if they were experiencing one or more of 39 "symptoms seen for the first time that are abnormal for you"; they were also asked in a separate set of questions using the same 39 symptoms about "abnormal symptoms that you have experienced at least one time before." As the data was collected, there was an abnormally high number of women who reported that they had experienced "Decidual Cast Shedding / release of a layer of uterine lining, a thick sack-like substance", as presented in the survey. Respondents who reported having experienced DCS in the past were excluded from the analysis data set.

A Google search of the phrase "decidual cast shedding" brings up the following definition: "a large, intact piece of tissue that is passed through the vagina in one solid piece. It happens when the thick mucus lining of the uterus, called the decidua, sheds in the near exact shape of a uterine cavity, creating a triangular cast" [19]. An extensive literature review of previous documented decidual cast shedding cases was performed by the authors, substantiating that this experience is extremely rare.

Literature search terms "decidual cast" and "membranous shedding" and "membranous dysmenorrhea" were used to identify the prevalence of DCS in the pre-pandemic era. We found fifteen publications between 1913 and 2022 detailing less than 40 cases of "decidual cast shedding" or "membranous dysmenorrhea" [3-18]. This was an inadequate sample size to establish a reliable pre-pandemic prevalence, which could best be described in qualitative terms as very rare. Descriptive statistics for the affirmed DCS population were reported as frequencies

*Hyperlink to Patient Testimonials of Respondents in MyCycleStory℠
https://www.thegms.co/publichealth/pubheal-ra-22041401-Patient-Testimonials-MyCycleStory.pdf

Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107-117. https://www.doi.org/10.46766/thegms.pubheal.22041401

and percentages or means and standard errors. Survey procedures were used to analyze the data.

Results

There were 292 (4.83 % of the sample) predominantly non-Hispanic white women who identified a DCS incident during the 7.5 months of data collection in mid-to-late 2021, and 96.2% of these respondents reported that they had experienced health problems or menstrual irregularities since January 2021. The mean age was 36.1 ± 0.5 (SEM) years, with 16.5% reporting the use of intrauterine devices or hormonal contraceptives. Additionally, 9.2% reported taking non-contraceptive hormonal therapies and 17.2% reported that they were trying to conceive. A description of the DCS sample is included in **Table 1**.

Table 1. Demographic and Lifestyle Characteristics – *DCS Participants Only* (Frequency (%) or Mean [SEM])

Characteristic	Total n=292
Age	36.1 [0.5]
Consider yourself healthy (yes)	247 (94.3)
General Stress Level	
Low to none	17 (6.4)
Mild	86 (32.3)
Moderate	110 (41.4)
Heavy at times	47 (17.7)
Unbearable at times	6 (2.2)
Typical menstrual regularity	
Do not menstruate now	9 (3.1)
Rarely menstruate	7 (2.4)
Irregular or occasional	17 (5.9)
Regularly occurring	257 (88.6)
Typical menstrual length	
Do not menstruate now	8 (2.7)
1 - 3 days	19 (6.5)
3 - 5 days	146 (50.0)
5 - 7 days	103 (35.3)
7+ days	16 (5.5)
Typical menstrual flow	
Unpredictable	12 (4.1)
Rarely or do not menstruate now	10 (3.4)
Light	27 (9.2)
Moderate	204 (69.9)
Heavy	39 (13.4)
Peri- or post-menopausal	22 (7.5)
Trying to conceive	47 (17.2)
Number of abnormal symptoms experienced for the 1st time**	7.4 [0.2]
Have experienced abnormal health reactions or menstrual irregularities since January 2021	279 (96.2)
Contraception use	
Have Intrauterine Device (IUD)	16 (5.5)
On hormonal contraceptive	32 (11.0)
On non-contraceptive hormone therapy	27 (9.2)

****39 total abnormal symptoms**

*Hyperlink to Patient Testimonials of Respondents in MyCycleStory℠
https://www.thegms.co/publichealth/pubheal-ra-22041401-Patient-Testimonials-MyCycleStory.pdf

Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107-117. https://www.doi.org/10.46766/thegms.pubheal.22041401

We surveyed the stress levels of the women in our DCS cohort, and the responses resembled a normal distribution with 41.4% having moderate stress levels. More than half (50.9%) reported that they had experienced COVID-19 symptoms but were never tested.

Figure 2 shows the temporal trends of two related Google search terms in the United States from September 2020 through March 2022. The two terms were "decidual cast" and "decidual cast covid vaccine". There was a small increase in January and February 2021 for "decidual cast covid vaccine" searches. During this time, the first injection of the COVID-19 vaccine was being introduced to the US population. Searches increased dramatically in April 2021 and then again in June 2021. These peak Google searches represent a more than 2000% increase from the prior and subsequent months of these peaks. The MyCycleStory℠ was fielded starting in mid-May with 85% of data collected by the end of July.

Discussion

The most striking finding of this study is the remarkable incidence of decidual cast shedding (DCS) among the survey respondents, which identified 292 respondents noting a DCS event over 7.5 months in 2021. In comparison, all previously published medical literature spanning 109 years describes less than 40 cases [3-18]. Undoubtedly, this is a significant surge in DCS events. Given the contemporaneous occurrence of the pandemic and the menstrual irregularities, one can only speculate as to the exact etiology of the DCS events among the survey respondents. Normal ovulatory menstrual cycles should not result in DCS but rather in normal organized menstruation. The temporal relationship of the rapid increase in DCS with the pandemic begs the question of a relationship to other factors such as stress [20, 21], spike protein exposure (from COVID-19 or vaccination), or other factors [22]. Our data suggest that there is not a correlation between these DCS events and high levels of stress or the use of contraceptive and hormonal therapies.

The highly technical and rare medical term "decidual cast" or "membranous dysmenorrhea" is largely unknown by most healthcare workers. Lay public would rarely, if ever, have knowledge of this term unless they searched it on the internet. The remarkable rise in the search engine term "decidual cast" suggests the survey respondents most likely identified this term by an internet search (**Figure 2**). The majority (85%) of survey data was collected in May-July 2021, and this timing aligns with the June peak of term searches. We hypothesize that survey participants were searching for the definition or images associated with this term, to determine if it aligned with the symptom(s) they experienced. However, the spike in searches in the month of April, was before the survey was distributed and towards the beginning of when the menstrual conversations began to gain momentum on social media. We speculate that individuals were researching their own abnormal experience to better understand the phenomenon, prior to being exposed to our survey. These timeframes also align with the onset of widespread COVID-19 vaccine distribution. These correlations should prompt future studies into the cause of DCS in women during the pandemic.

In two publications from 1913 describing decidual cast events, the authors associated them with spontaneous abortions or ectopic pregnancies [6, 7]. One speculation in these publications was that half of ectopic pregnancies result in a decidual cast event [6, 7]. In more recent literature, over a century later, the reports have focused on a different population. A 2021 review of 14 cases in the pediatric literature found that 43% were associated with depo-medroxyprogesterone acetate, 43% with combined oral contraceptives, and 14% with the patch-dispensed ethinyl estradiol-norelgestromin [3, 4]. The average time between initiation of hormonal contraceptive therapy and decidual cast formation was 4.7 months (range 21 days to 15 months). The authors hypothesized that pediatric cases may be related to an exaggerated response to increased progestin in an immature uterus [4]. A 2015 case study and literature review included non-adolescent cases [14]. The authors found a total of 21 cases: 13 of 21 occurring in young adults age 20 years or less; 4 of 21 in women aged 41-51 years; and 5 of 21 in women on oral contraceptives [14]. Thus, the sum of the literature suggests different causes for this phenomenon across ages, some of which are now thought to be related to iatrogenic causes. In our survey respondents, only 11% were on hormonal contraception.

This survey-based study was not designed to determine the etiopathophysiology of this surge in DCS occurring during the COVID-19 pandemic. We assume that the self-reports from the survey respondents represent the clinical definition of a decidual cast, however a clinical examination and pathology report would provide stronger evidence and would be required to determine which of these events were spontaneous abortions or ectopic

*Hyperlink to Patient Testimonials of Respondents in MyCycleStory℠
https://www.thegms.co/publichealth/pubheal-ra-22041401-Patient-Testimonials-MyCycleStory.pdf

Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107-117. https://www.doi.org/10.46766/thegms.pubheal.22041401

pregnancies. There is emerging evidence that exposure to the spike protein, either through natural exposure, vaccination, or shedding of the spike protein through exosomes, may be associated with significant menstrual abnormalities [23, 24].

Here, we speculate on possible causes of this DCS phenomenon. One hypothesis is that the COVID-19 vaccine interrupts the complex balance of ovulation orchestrated by the hypothalamic-pituitary-ovarian axis and thus produces anovulatory bleeding disorders. It is known from COVID-19 mRNA vaccine documents that there is concentration of the nanolipid particles and the mRNA cargo in the ovaries [22]. This produces significant inflammatory response in the ovaries and could contribute to menstrual abnormalities, although there are many other potential mechanisms that could be involved.

COVID-19 vaccination is associated with both micro- and macro-arterial and venous thromboembolism [25]. An unusual clotting process associated with fibrin deposition appears as a white "tissue-like" material in vaccine recipients, and embalmers have observed very extensive and durable white clots that are removed post-mortem in the embalming process [25]. Figure 6 depicts multiple clots extracted intact by an embalmer who describes the blood as "abnormally thickened and sticky" and difficult to wipe off gloves or the embalming table. He further notes that the extracted blood clots are very durable and difficult to break up. Embalmers have apparently never seen this phenomenon prior to the pandemic. We speculate that one potential explanation of the surge in reports of decidual cast shedding could represent a similar appearing tissue-like substance that is composed of fibrin-laden clot rather than a simple decidual cast.

Limitations

There are several limitations of this preliminary report. First, it is an observational study of patient questionnaires and certainly subject to sample bias. Second, the decidual casts were not confirmed by pathological analysis but self-reported. Third, the pre- and post- pandemic prevalence of DCS cannot be accurately determined at the time of this writing.

Summary

In summary, this survey study showed a surge in DCS experiences after the distribution of the COVID-19 vaccines. The possibility that a hypercoagulable state could cause a fibrin structure resembling DCS in menstruating women merits further study.

Conflicts of Interest

None of the authors report conflicts of interest.

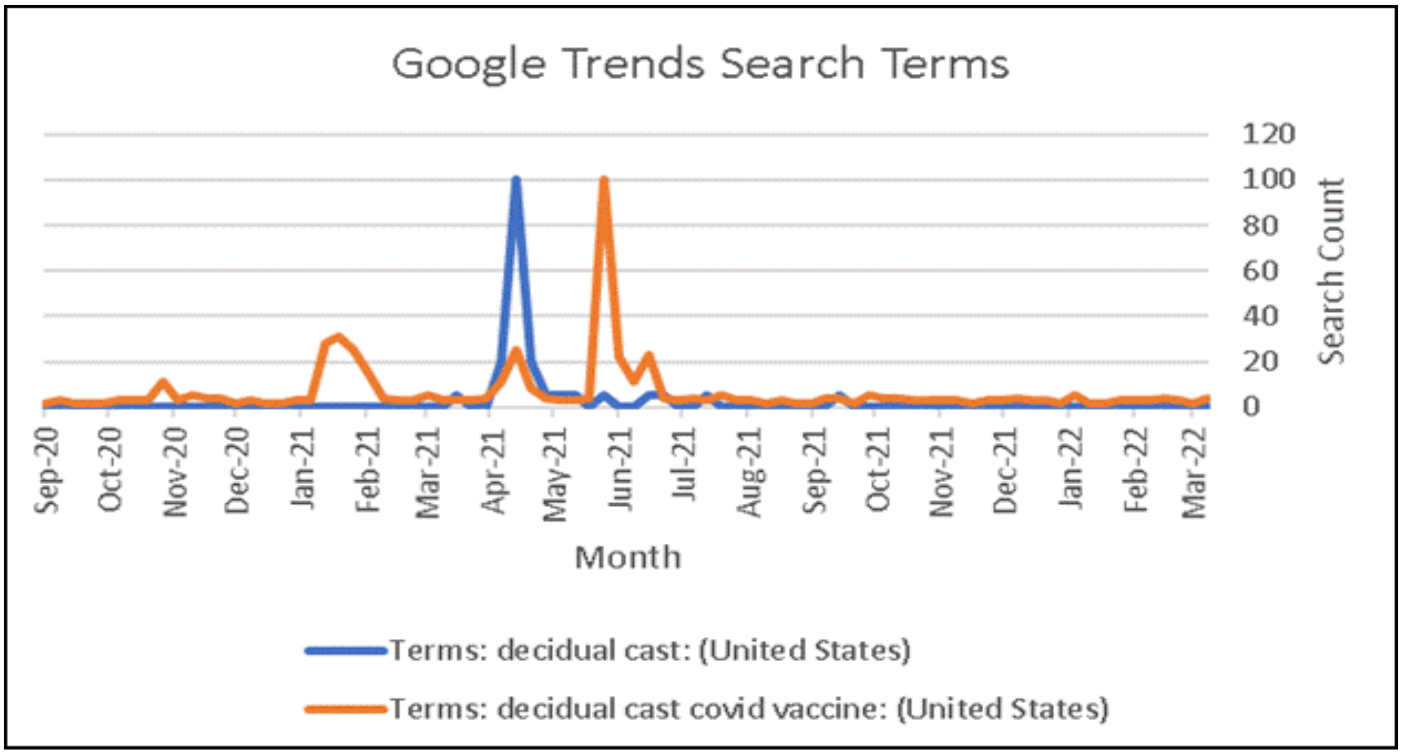
*Hyperlink to Patient Testimonials of Respondents in MyCycleStory℠
https://www.thegms.co/publichealth/pubheal-ra-22041401-Patient-Testimonials-MyCycleStory.pdf

Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107-117. https://www.doi.org/10.46766/thegms.pubheal.22041401

Figure 1. A decidual cast passed at a physician's office, after two days of severe abdominal pain and cramping. This patient started medroxyprogesterone six weeks prior to passing this mass measuring 5 cm × 6 cm × 1 cm. Her pelvic discomfort completely resolved after the mass was passed [15]. Error! Bookmark not defined.

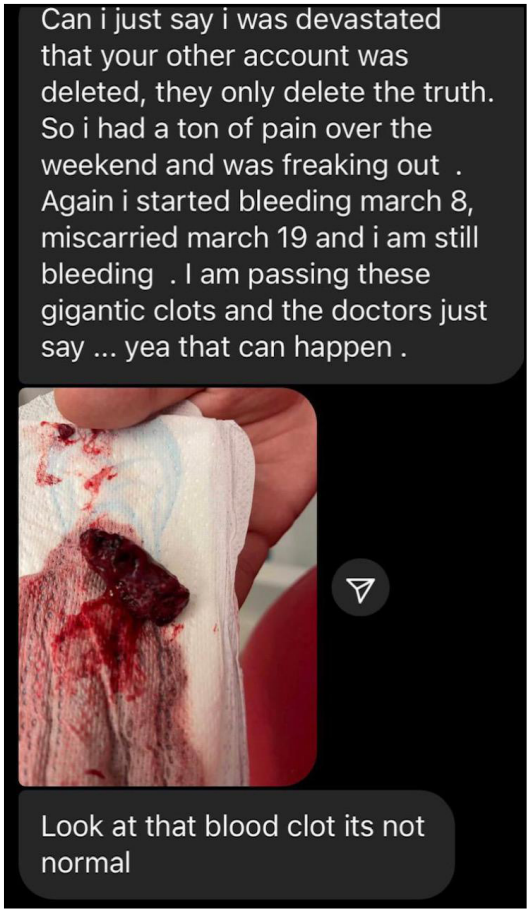
Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107-117. https://www.doi.org/10.46766/thegms.pubheal.22041401

Figure 2. Google Trends in Search Terms September 2020 to March 2022.



Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107-117. https://www.doi.org/10.46766/thegms.pubheal.22041401

Figures 3, 4, 5. Depictions of DCS specimens from MyCycleStorySM participants. Participants were so distressed by their abnormal menstrual phenomena documented with photographs.



*Hyperlink to Patient Testimonials of Respondents in MyCycleStorySM
https://www.thegms.co/publichealth/pubheal-ra-22041401-Patient-Testimonials-MyCycleStory.pdf

Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107-117. https://www.doi.org/10.46766/thegms.pubheal.22041401

Figure 6. Post-mortem organized thrombi.
(Courtesy: Richard Hirschman.)

*Hyperlink to Patient Testimonials of Respondents in MyCycleStory℠
https://www.thegms.co/publichealth/pubheal-ra-22041401-Patient-Testimonials-MyCycleStory.pdf

Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107-117. https://www.doi.org/10.46766/thegms.pubheal.22041401

References

1. Clancy Lab. Menstrual experiments with Covid-19 vaccines (2021, October 9). Available at: https://clancylabs.com/projects/menstrual-experiences-with-covid-19-vaccines/Accessed 4/10/22.

2. "More About Our Study." My Cycle Story: A Research Study. MyCycle Story, May 31, 2021. https://mycyclestory.com/home/about/.

3. Fukaura R, Ward A, Datta S. (2021) Delayed Miscarriage Inside an Infected Decidual Cast: A Rare Complication of the Depo medroxyprogesterone Acetate Injection. BMJ Case Reports CP 2021;14:e238583.

4. Parkes, Presley, et al. (2021). Endometrial Cast Expulsion: A Rare Cause of Pelvic Pain Case Report and Review of the Literature. Journal of Adolescent Health, 68.5, 1017-1019.

5. Brooks, H.W., Kosmak, G.W. Decidual Casts: With Four Illustrations. *The American Journal of Obstetrics and Diseases of Women and Children*. July-December,1913;68:704

6. Wells, B.H. and Kosmak, G.W. (1913, October). Decidual Casts. *The American Journal of Obstetrics and Diseases of Women and Children*, 68(4), 704-707.

7. [No authors listed]. Decidual Cast from the Unimpregnated Horn of a Didelphic Uterus. *Proc R Soc Med.* 1914;7(Obstet Gynaecol Sect):221. PMID: 19978009; PMCID: PMC2004034.

8. O'Leary, J. A., and O'Leary, J. L. (1964). Decidual Cast as a Cause of Antepartum Hemorrhage. *American journal of obstetrics and gynecology*, 88, 1093–1094. https://doi.org/10.1016/s0002-9378(16)35095-5

9. Shaw, D.D., and Baker, J.W. (1985). A Decidual Cast Following Therapy with Norethisterone. *The Australian & New Zealand Journal of Obstetrics & Gynaecology*, 25(2), 138–139.

https://doi.org/10.1111/j.1479-828x.1985.tb00629.x

10. Singh, V., Talib, N., and Strickland, J. (2007). Decidual Cast in a Girl Receiving Depot Medroxyprogesterone Acetate--a case report. *Journal of Pediatric and Adolescent Gynecology*, 20(3), 191–194. doi:https://doi.org/10.1016/j.jpag.2006.08.002

11. Omar, H. A., and Smith, S. J. (2007). Membranous Dysmenorrhea: a case series. *The Scientific World Journal*, 7, 1900–1903. https://doi.org/10.1100/tsw.2007.277

12. Presented at the NASPAG 19th Annual Clinical Meeting, issues and answers in pediatric and adolescent gynecology, May 19–21, 2005, New Orleans, Louisiana. Oral case presentations. Decidual casts associated with depomedroxyprogesterone acetate treatment in adolescents. *Journal of Pediatric Adolescent Gynecology*. 2005; 18:217–218.

13. Sen, Y., Cimbek, E. A., and Uğraş, N. S. (2013). Decidual Cast After Discontinuation of Oral Contraceptives Use in a Young Girl. *Journal of Pediatric and Adolescent Gynecology*, 26(6), e127–e129. https://doi.org/10.1016/j.jpag.2013.04.011

14. Malik, M. F., Adekola, H., Porter, W., and Poulik, J. M. (2015). Passage of Decidual Cast Following Poor Compliance with Oral Contraceptive Pill. *Fetal and Pediatric Pathology,* 34(2), 103–107. ttps://doi.org/10.3109/15513815.2014.970263

15. Strauss, L. (2018, October 01). Fleshy Mass Passed Vaginally by a Young Woman. *American Family Physician, 98*(7), 449-450

16. Parkes, P. et al. (2021). Endometrial Cast Expulsion: A Rare Cause of Pelvic Pain Case Report and Review of the Literature. *Journal of Adolescent Health,* 68.5, 1017-1019.

17. Topcu, H., et al. (2015). Spontaneous Membranous Dysmenorrhea in an Adolescent Girl: A Case Report and Literature Review. *Journal of Pediatric and Adolescent Gynecology,* 28(5), e139-e141. doi:https://doi.org/10.1016/j.jpag.2014.11.001

18. Nunes, R. D. (2015). Membranous Dysmenorrhea - Case Report. *Obstetrics and Gynaecology Cases - Reviews*, 2(3). doi:10.23937/2377-9004/1410042

19. Sreenivas, S. (2021, June 8). Decidual Cast: What is it? WebMD. https://www.webmd.com/women/decidual-cast-what-is-it#:~:text=A%20decidual%20cast%20is%20a,creating%20a%20triangular%20%E2%80%9Ccast.%E2%80%9D

*Hyperlink to Patient Testimonials of Respondents in MyCycleStory℠
https://www.thegms.co/publichealth/pubheal-ra-22041401-Patient-Testimonials-MyCycleStory.pdf

Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107-117. https://www.doi.org/10.46766/thegms.pubheal.22041401

20. Nagma, S., Kapoor, G. et al. (2015). To Evaluate the Effect of Perceived Stress on Menstrual Function. *Journal of clinical and diagnostic research: JCDR*, *9*(3), QC01–QC3.

https://doi.org/10.7860/JCDR/2015/6906.5611

21. Palm-Fischbacher, S. and Ehlert, U. (2014) Dispositional Resilience as a Moderator of the Relationship Between Chronic Stress and Irregular Menstrual Cycle. *Journal of Psychosomatic Obstetrics & Gynecology*, 35:2, 42-50, DOI: 10.3109/0167482X.2014.912209

22. Thorp J.A., Renz T., Northrup C., Lively C., Breggin P., Bartlett R., et al. (2022, March 01). Patient Betrayal: The Corruption of Healthcare, Informed Consent and the Physician-Patient Relationship. *The Gazette of Medical Sciences*, 3(1), 46-69. https://doi.org/10.46766/thegms.medethics.22021403

23. Muhaidat N., Alshrouf M.A., Azzam M.I. et al. Menstrual Symptoms After COVID-19 Vaccine: A Cross-Sectional Investigation in the MENA Region. *International Journal of Women's Health*. 2022. 14:395-404 https://doi.org/10.2147/IJWH.S352167

24. Laganà, A. S., Veronesi, G., Ghezzi, F. et al. (2022). Evaluation of Menstrual Irregularities After COVID-19 Vaccination: Results of the MECOVAC Survey. *Open medicine (Warsaw, Poland)*, *17*(1), 475–484. https://doi.org/10.1515/med-2022-0452

25. Thorp K.E., Thorp J.A., and Thorp E.M. (2022). COVID-19 and the Unraveling of Experimental Medicine - Part II. *The Gazette of Medical Sciences*, 3(1): 074-106. doi:www.doi.org/10.46766/thegms.pubheal.22022804

26. Hyperlink to Patient Testimonials of Respondents in MyCycleStory℠. https://www.thegms.co/publichealth/pubheal-ra-22041401-Patient-Testimonials-MyCycleStory.pdf

Parotto T, Thorp JA, Hooker B, Mills PJ, Newman J, Murphy L, et al. COVID-19 and the surge in Decidual Cast Shedding. G Med Sci. 2022; 3(1): 107-117. https://www.doi.org/10.46766/thegms.pubheal.22041401