Case Reports in Women's Health 39 (2023) e00538

Contents lists available at ScienceDirect

Case Reports in Women's Health

journal homepage: www.elsevier.com/locate/crwh

Painful bruising: Gynecology, hematology, or just *pill bias*? A case report

Gabriela Villamor *, Deborah Winograd, Jonathan D. Baum

Jersey Shore University Medical Center Department of Obstetrics and Gynecology, Neptune, NJ, United States

ARTICLE INFO

Keywords:
Oral contraceptive pills
Thrombosis
Ecchymosis
bias
Anchoring
Confirmation

ABSTRACT

A 23-year-old woman, G0, presented to the emergency department with painful bruising of the legs shortly after starting an oral contraceptive pill. The presumed diagnosis was pill-induced ecchymosis, and she was instructed to discontinue the medication. Her bruising resolved. However, the working diagnosis was later questioned as the patient had used other oral contraceptive pills in the past without any adverse reaction. In addition, there is robust literature associating these medications with thrombosis, not bruising.

The patient later disclosed that she had concomitantly started an oral hair supplement along with her oral contraceptive pill. Analysis of the supplement contents revealed that it contained extract of *Aesculus hippocastanum*, a herbal anticoagulant, making this a much more plausible explanation for the ecchymosis. She then resumed the original oral contraceptive pill alone without any reaction.

The case highlights how cognitive bias resulted in a misdiagnosis. Specifically, this case introduces the concept of *pill bias*, as the patient's unexplained bruising was presumed to be a result of her use of an oral contraceptive despite the lack of evidence to support this claim. This bias has the potential to impact clinical decision-making and lead to clinical errors.

1. Introduction

Many errors in clinical decision-making are attributable to cognitive bias. Anchoring bias is the overreliance on information gathered early in the diagnostic process. Confirmation bias is a tendency to seek evidence that supports the suspected diagnosis and to overlook evidence that refutes it [1]. This case demonstrates how both anchoring and confirmation biases framed oral contraceptive pills (OCPs) as the cause of an adverse reaction. Once the pill was identified as part of the history of the present illness, pertinent information was overlooked, which skewed the clinical judgment. This led providers to dismiss unusual signs and symptoms as merely an adverse effect of OCPs without significant evidence to support this claim.

The case presented concerns a young woman who was misdiagnosed as a result of her OCP use. This case introduces the concept of *pill bias*, pertaining to the cognitive biases at play in the management of a reproductive-aged woman taking OCPs. The patient consented to presentation/publication of her case prior to the submission of the manuscript.

2. Case Presentation

A healthy 23-year-old woman, G0, presented to the emergency department (ED) with painful bruising of the legs shortly after starting an oral contraceptive pill containing 0.15 mg desogestrel and 0.03 mg ethinyl estradiol. Her medical history was significant for anxiety disorder and breast reduction surgery. She had no known drug allergies and was taking a probiotic along with a multivitamin. She was in no distress and able to convey her medical history without hesitation. Vital signs were normal. Body mass index (BMI) was 25. She did not smoke, drink alcohol, or use recreational drugs.

Examination showed no abnormalities of the head, neck, chest, or abdomen, but diffuse, tender bruising of both legs was noted (Fig. 1). Complete blood count (CBC) showed normal white blood count (8.2 K/μL), hemoglobin (13.2 g/dL), and platelet count (253 K/μL). Coagulation studies, including prothrombin time, partial thromboplastin time, INR and d-dimer, were normal (Table 1). Duplex venous Doppler of the legs was negative for deep venous thrombosis. Given the normal laboratory workup and imaging studies, and no other obvious explanation for her painful bruising, she was instructed to discontinue her OCP with a presumed diagnosis of ecchymosis secondary to oral contraception. She was discharged home and her bruising resolved within two weeks

* Corresponding author at: 1945 NJ-Route 33, Neptune, NJ 07753, United States.
E-mail address: gabriela.villamor@hmhn.org (G. Villamor).

https://doi.org/10.1016/j.crwh.2023.e00538
Received 31 July 2023; Received in revised form 29 August 2023; Accepted 30 August 2023
Available online 31 August 2023

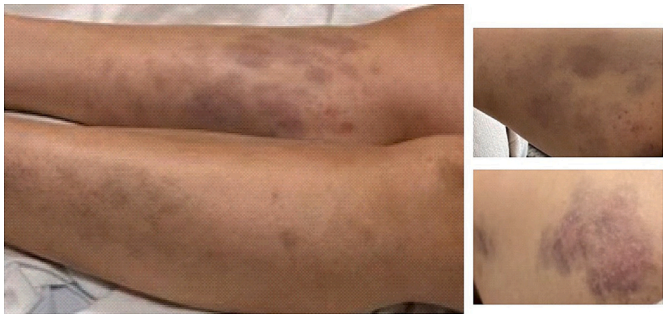

Fig. 1. Patient ecchymosis of bilateral lower extremities.

Table 1
Patient laboratory values. All within normal range.

Laboratory Value	Result
White Blood Cell Count	8.2 K/uL
Hemoglobin	13.2 g/dL
Hematocrit	40.20%
Platelets	253 K/uL
D-Dimer	78 ng/mL
Prothrombin Time	11 s
INR	0.92
PTT	32.5 s

Fig. 2. Resolution of ecchymosis shown at follow-up visit.

(Fig. 2).

The patient returned to her gynecologist and a hematology evaluation was recommended. After ruling out hemophilia and thrombophilia, the working diagnosis of ecchymosis secondary to OCPs was now questioned. Additional history obtained at a follow-up visit led to an alternative hypothesis. The patient shared that she had concomitantly started an oral hair supplement, called Shen Min, along with her OCP. Analysis of the supplement revealed that it contained an herbal anticoagulant, an extract of *Aesculus hippocastanum*, making this a much more plausible explanation for her clinical presentation. She subsequently resumed the original OCP alone without recurrence of ecchymosis or other adverse reaction.

3. Discussion

This case illustrates the impact of cognitive bias on clinical decision-making. When a reproductive-aged woman presented with unusual bruising after starting an OCP, the search for the most plausible cause stopped once her history revealed she was taking *the pill*. Instead of investigating further, anchoring bias led to a false conclusion. This error was perpetuated when the bruising resolved. Confirmation bias led to the acceptance of this diagnosis that lacked physiologic basis. It is with these specific biases and attitudes toward OCPs that the concept of *pill bias* is introduced.

Scott (2009) highlighted common errors in clinical reasoning. Frequently cited explanations for decision errors include: "I paid too much attention to one finding" and "I didn't reassess the situation when things didn't fit." [1] This may be particularly true in regard to OCPs, which have become a frequent scapegoat for unusual or unexplained findings.

OCPs are one of the most widely studied classes of medications and the most popular method of contraception for women in the United States. It is well known that estrogen-containing OCPs increase coagulation factors, thereby increasing the risk of thrombosis [2,3]. This risk of thrombosis is so heavily emphasized in the literature that many providers almost automatically recommend against OCP use or discourage a current pill user from continuing this medication due to this risk. What is often overlooked, however, is that the absolute risk of thrombosis with OCP use is considerably lower than that associated with pregnancy (which the pill prevents) [4]. Yet, we do not recommend against pregnancy with the same vigor as we recommend against OCP use. Regardless of source, be it lack of knowledge or fear, this *pill bias* has the potential to be a significant barrier to initiation and continuation of OCPs.

It is now obvious that bruising in our patient reflects a *bleeding* event rather than a *thrombotic* event. At the time of writing, a review of the literature did not show any significant data to establish OCPs as a cause for bruising [5,6]. An important alternative hypothesis for our patient's symptoms was overlooked at the time she presented to the ED. She was also taking a hair supplement called *Shen Min*. This supplement contains an extract of *Aesculus hippocastanum* (horse chestnut), which is known to contain coumarins [7–10]. Given the anticoagulant properties of coumarins, this supplement provides a more biologically plausible explanation for bruising. However, it was easier, albeit potentially more harmful, to blame the pill rather than working through a broader differential diagnosis.

The presented case provides a cautionary example of how *pill bias* led to an incorrect diagnosis while the use of a potentially harmful herbal supplement was overlooked. Clinical judgment was clouded by bias and an important, often necessary medication, was discontinued. This case also serves as a reminder of the importance of obtaining a thorough history prior to the initiation of OCPs and during follow-up of a patient on OCPs. It is standard to review a patient's full medical history and medication list, but a review of any herbs or supplements the patient is taking must not be forgotten. As seen in this case, obtaining that particular history provided vital information that played a role in the patient's medical course.

Pill bias has the potential to dissuade women from using an important and safe medication. It may also influence providers to misdiagnose or ignore signs and symptoms of something unrelated to the pill. *Pill bias* put this patient at risk for unplanned pregnancy while her workup was being completed. Cases such as the one presented highlight errors in clinical decision-making that can and should be avoided. Providers must recognize and examine their own attitudes toward the pill and educate others to do the same.

4. Conclusion

The purpose of this case report is to introduce and emphasize the concept of *pill bias*. Errors in clinical decision-making began as soon as a reproductive-aged woman disclosed her use of an oral contraceptive pill. Her use of an herbal blood thinner was overlooked. Attitudes toward the pill must be studied in order to minimize bias in the management and counseling of reproductive-aged women.

Contributors

Gabriela Villamor contributed to the conception of the case report, acquisition of data, analysis and interpretation of data, and written drafts of the article.

Deborah Winograd contributed to the conception of the case report, analysis and interpretation of data, and critical revision of the article for important intellectual content.

Jonathan D. Baum contributed to patient care, conception of the case report, acquisition of data, analysis and interpretation of data, written drafts of the article, and critical revision of the article for important intellectual content.

All authors gave final approval of the submitted manuscript.

Funding

The authors received no funding from an external source.

Patient consent

The patient consented to presentation/publication of the clinical details and images included prior to the submission of the manuscript.

Provenance and peer review

This article was not commissioned and was peer reviewed.

Acknowledgements

The authors would like to acknowledge Meghan Rattigan, DO for her contribution to patient care.

Conflict of interest statement

The authors declare that they have no conflicts of interest regarding the publication of this case report.

References

[1] I. Scott, Errors in clinical reasoning: causes and remedial strategies, BMJ 338 (2009), b1860.
[2] Risk of venous thromboembolism among users of drospirenone-containing oral contraceptive pills. Committee Opinion No. 540. American College of Obstetricians and Gynecologists, Obstet. Gynecol. 120 (2012) 1239–1242.
[3] A. Gialeraki, S. Valsami, T. Pittaras, G. Panayiotakopoulos, M. Politous, Oral contraceptives and HRT risk of thrombosis, Clin. Appl. Thromb. Hemost. 24 (2) (2016) 217–225, https://doi.org/10.1177/1076029616683802.
[4] K.M. Curtis, T.C. Jatlaoui, N.K. Tepper, et al., U.S. selected practice recommendations for contraceptive use, 2016, MMWR Recomm. Rep. 65 (RR-4) (2016) 1–66, https://doi.org/10.15585/mmwr.rr6504a1.
[5] T. Jacobi, Case study - a woman with unexplained bruising, GP, Dec. 2008, https://www.gponline.com/case-study-woman-unexplained-bruising/article/866211 (Accessed 10 Feb 2022).
[6] C. Andrews, J. Mathew, The morning after rash: erythema nodosum due to emergency contraception, J. Case Rep. Images Med. 4 (2018), 100045Z09CA2018.
[7] G. Karatoprak, Chapter 3.26 - Horse Chestnut, in: Seyed Mohammad Nabavi, Ana Sanches Silva (Eds.), Nonvitamin and Nonmineral Nutritional Supplements, Academic Press, 2019, pp. 295–299. ISBN 9780128124918, https://doi.org/10.1016/B978-0-12-812491-8.00042-4.
[8] LiverTox: Clinical and Research Information on Drug-Induced Liver Injury, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda (MD), 2012. *Polygonum Multiflorum*. [Updated 2020 Aug 18]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK548795/.
[9] A. Cardenas, J. Restrepo, F. Sierra, G. Correa, Acute hepatitis due to shen-min: a herbal product derived from Polygonum multiflorum, J. Clin. Gastroenterol. 40 (7) (2006) 629–632, https://doi.org/10.1097/00004836-200608000-00014.
[10] A. Owczarek, J. Kolodziejczyk-Czepas, J. Woźniak-Serwata, A. Magiera, N. Kobiela, K. Wąsowicz, M.A. Olszewska, Potential activity mechanisms of Aesculus hippocastanum bark: antioxidant effects in chemical and biological in vitro models, Antioxidants. 10 (7) (2021) 995, https://doi.org/10.3390/antiox10070995.