International Journal of Women's Health

Dovepress
open access to scientific and medical research

Open Access Full Text Article

REVIEW

Menstrual suppression: current perspectives

This article was published in the following Dove Press journal:
International Journal of Women's Health
23 June 2014
Number of times this article has been viewed

Paula Adams Hillard

Department of Obstetrics and Gynecology, Stanford University School of Medicine, Stanford, CA, USA

Abstract: Menstrual suppression to provide relief of menstrual-related symptoms or to manage medical conditions associated with menstrual morbidity or menstrual exacerbation has been used clinically since the development of steroid hormonal therapies. Options range from the extended or continuous use of combined hormonal oral contraceptives, to the use of combined hormonal patches and rings, progestins given in a variety of formulations from intramuscular injection to oral therapies to intrauterine devices, and other agents such as gonadotropin-releasing hormone (GnRH) antagonists. The agents used for menstrual suppression have variable rates of success in inducing amenorrhea, but typically have increasing rates of amenorrhea over time. Therapy may be limited by side effects, most commonly irregular, unscheduled bleeding. These therapies can benefit women's quality of life, and by stabilizing the hormonal milieu, potentially improve the course of underlying medical conditions such as diabetes or a seizure disorder. This review addresses situations in which menstrual suppression may be of benefit, and lists options which have been successful in inducing medical amenorrhea.

Keywords: menstrual molimena, amenorrhea, inducing amenorrhea, quality of life

Background

Suppression of menstrual periods to provide relief of menstrual-related symptoms has been used in a variety of medical conditions since the availability of steroid hormone therapy. This option has gained legitimacy through its use in treating symptoms, but is now being used more frequently by women for personal preference. A recent Cochrane review of trials comparing 28-day and extended cycles found comparable contraceptive efficacy and safety.[1] The review found overall discontinuation rates and discontinuation for bleeding problems to be similar. Extended cycling resulted in improved headaches, genital irritation, tiredness, bloating, and menstrual pain.[1]

The term "therapeutic amenorrhea" was first used in the mid-1960s to describe the suppression of menstrual bleeding in women with hematologic disorders and coagulation defects leading to heavy menstrual bleeding.[2,3] A small randomized trial in 1971 in the US compared a high-dose combination oral contraceptive pill, given continuously, with depot medroxyprogesterone acetate (DMPA) or DMPA plus daily conjugated estrogens.[3] The differences among these regimens were not significant.

When oral contraceptives containing a synthetic estrogen and a progestin were initially developed, an arbitrary regimen comprising 21 days of hormonally active pills followed by 7 days of placebo or a hormone-free interval were devised to mimic the natural menstrual cycle ("the Pill"). It was even the belief of one of the original developers of oral contraceptives, John Rock, MD, that this cycling would provide a

Correspondence: Paula J Adams Hillard
Department of Obstetrics and Gynecology, 300 Pasteur Dr, MC5317, Stanford University School of Medicine, Stanford, CA 94305-5317, USA
Tel +1 650 725 5986
Fax +1 650 723 7737
Email paula.hillard@stanford.edu

regimen that was acceptable to the Pope, as he reasoned that the Pill was simply a natural variant of the rhythm method of contraception.[4] Pope Pius XII had approved the Pill in 1958 for the treatment of medical conditions such as menstrual pain, given that its contraceptive actions were an "indirect" effect. John Rock's argument that the Pill was natural, by virtue of mimicking the normal menstrual cycle,[4] was ultimately rejected by Pope Paul VI in 1968.[5]

Clinicians have used hormonal therapy to suppress menstruation since combination birth control pills were initially developed. Continuous hormonal therapy has been used when menstrual bleeding is medically problematic or even life-threatening, such as in patients with aplastic anemia or in bleeding disorders such as thrombocytopenia or severe Von Willebrand disease. Pelvic pain and dysmenorrhea in conditions such as endometriosis or uterine leiomyomata have been managed historically with menstrual suppression as well.[6] Medical conditions that may benefit from menstrual suppression are listed in Table 1.

The question "Is menstruation obsolete?" was raised by Coutinho and Segal in a popular press book of this name, published in 1999.[6] These authors cited a variety of symptoms, including dysmenorrhea, bloating, breast tenderness, premenstrual syndrome (PMS), nausea, and edema, as well as medical conditions including migraine headaches, endometriosis, epilepsy, and anemia, that could be improved by menstrual suppression.

Sulak et al reported that extending the duration of hormonally active pills improved menstrual symptoms including dysmenorrhea, menorrhagia, premenstrual-type symptoms, and menstrual migraines.[7] Investigators have asked, "Should monthly menstruation be optional for women?" and have described extended-cycle oral contraceptives as "menstrual nirvana".[8,9] Women's autonomy and the right to choose and regulate their cycles for whatever reason has been a focus of publications and debate.[10,11]

In 2003, an oral contraceptive pill formulation was approved by the US Food and Drug Administration (FDA) with packaging for a dosing regimen that provided 82 days of hormonally active pills, followed by 7 days of placebo. In 2007, a pill providing continuous combined hormonal therapy, 365 days/year, was approved by the FDA. The availability of these specific combined oral contraceptive regimens led to greater use of hormonal therapy to reduce the frequency of menstruation, or attempts to eliminate it. Prior to this dedicated packaging or an extended regimen, clinicians described to women how to use the traditionally packaged pill formulations by discarding the placebo pills and tailoring the dosing regimen.

Table 1 Medical conditions that may benefit from menstrual suppression

Gynecologic conditions
Chronic pelvic pain[32]
Dysmenorrhea[33]
Endometriosis[34,35]
Heavy menstrual bleeding[30,32]
Uterine leiomyomata
Anemia due to heavy menstrual bleeding
Irregular bleeding/anovulation
Polycystic ovary syndrome (PCOS)[36]
Perimenopausal symptoms[32]
Premenstrual syndrome (PMS)/premenstrual dysphoric disorder (PMDD)[37–39]
Pre-procedure
Obstructing utero-vaginal anomalies pending definitive surgery[40]
Pre-operative endometrial thinning prior to endometrial ablation[41]
Menstrual molimina[42]
Breast pain
Headaches
Nausea/cyclic vomiting
Hematologic conditions
Anticoagulation[43]
Malignancy requiring chemotherapy/BMT[44]
Inherited anemia/bleeding disorders[45,46]
Sickle cell disease[47]
Thalassemias
Fanconi anemia
Von Willebrand disease[48]
Hemophilia, clotting factor deficiencies
Other hematologic conditions
ITP/thrombocytopenia[49]
Mental retardation/developmental delay[50,51]
Behavioral issues/PMS symptoms
Contraception
Hygiene/inability to manage menstrual products
Neurologic disease
Migraine headaches[52,53]
Menstrual migraines
Menstrual-associated migraines
Seizure disorders[54–56]
Catamenial seizures
Other conditions associated with menstrual exacerbation[57,58]
Anaphylactoid reactions[59]
Asthma[60,61]
Catamenial pneumothorax[62]
Diabetes mellitus[63]
Irritable bowel syndrome[64,65]
Pancreatitis[66]
Rheumatoid arthritis
Skin conditions
Acne[60]
Other
Deployed military personnel[67]
Female athletes[32]
Physical difficulty with managing menstrual hygiene
Cerebral palsy
Rheumatoid arthritis

Abbreviations: BMT, bone marrow transplant; ITP, idiopathic thrombocytopenic purpura; PMS, premenstrual syndrome.

While there are many medical conditions that are improved with menstrual suppression, healthy women who were prescribed oral contraceptive pills in the traditional fashion have learned that their cycles could be manipulated. Prior to the advent of the specifically packaged extended cycle regimens, women would occasionally extend their cycles by a few days to a week to allow for planning special events, vacations, or athletic events. The availability of extended cycle regimens led to more discussion of this option. The acceptability of extended cycles has generally been good, with irregular bleeding or spotting being the most common side effect; bleeding tends to decrease in successive cycles.[12–15] Irregular, unscheduled bleeding with an extended regimen may be unacceptable to some women, leading to discontinuation.

A number of polls have cited women's opinions about the frequency of preferred menstrual bleeding. Some polls suggest that up to half of women may prefer a menstrual frequency of "never", although the acceptability of amenorrhea has cultural determinants and varies widely.[16,17] An international study involving women in Nigeria, South Africa, Scotland, and the People's Republic of China found that most women dislike menstruation, and in all of the countries studied except the People's Republic of China, most women expressed a willingness to try a contraceptive method that induced amenorrhea.[18]

There remain women who believe it's unnatural or not normal to suppress menses.[19] Studies in the US and in other countries including Germany and Brazil have found that many women consider monthly bleeding as reassurance that they are not pregnant.[16,20]

The efficacy and safety of menstrual suppression has been supported by a number of studies and is recognized in a Cochrane Database Systematic Review.[1] The Cochrane review cites possible improved compliance, greater satisfaction, fewer menstrual symptoms, and less menstruation-related absenteeism from work or school. While no studies have shown differences in the contraceptive efficacy of traditional pill packaging versus extended cycling, the greater suppression of follicular development that has been demonstrated with extending cycling would suggest a theoretical edge in favor of less likelihood of development of a follicle and thus lower risk of ovulation, leading to greater efficacy.[21] Greater ovarian and endometrial suppression with continuous use has been shown in a randomized trial of continuous versus cyclical oral contraceptives.[22]

The lack of excessive endometrial proliferation has been described,[23] and is reassuring. However, the Society for Menstrual Cycle Research maintains a 2007 position statement stating that "menstruation is not a disease, and that further research on the potential health risks and long-term safety of cycle-stopping contraception is still needed".[24]

This review addresses the many medical conditions that may be improved by menstrual suppression, as well as the benefits and potential side effects of various options for the medical suppression of menstruation.

While more studies and reviews have focused on the potential benefits of menstrual suppression with the use of combined oral contraceptive pills, other combined estrogen and progestin hormonal delivery systems (patches and rings) have also been used in a continuous fashion, and likely confer similar benefits.[25–28] New formulations and delivery systems are in development, and some of these options may prove to have similar benefits for menstrual suppression when additional studies are performed to assess non-contraceptive benefits.[29]

Treatment options for menstrual suppression

A variety of medications have been used to induce therapeutic amenorrhea, including: extended cycle or continuous use of oral combined contraceptives; various progestin delivery systems (depot medroxyprogesterone acetate administered intramuscularly [IM] or subcutaneously, oral progestins, intrauterine systems); gonadotropin-releasing hormone (GnRH) analogs, and older drugs such as danazol.[30] Table 2 summarizes the formulations that have been used in this manner, along with their dosing regimens, limitations, and efficacy in inducing amenorrhea, as well as potential advantages and disadvantages. Some of these therapies represent unlabeled use of an FDA-approved medication, and clinicians should review the data supporting their use for a specific clinical indication; such use is not precluded by the FDA, and clinicians frequently use drugs for such unlabeled indications when supported by evidence and clinical judgment.[31]

The primary clinical limitation in virtually all regimens is the inability to perfectly suppress menses from the time of initial dosing. This relates in part to initiation of therapy at varying times in the menstrual cycle, and in varying clinical settings in which the endometrium may have proliferative or secretory histology, and the hypothalamic–pituitary–ovarian axis may be supporting ovulatory or anovulatory cycles. Most therapeutic options have similar efficacy in menstrual suppression at the end of one year of use, but most also have considerable rates of irregular, unpredictable, or unscheduled bleeding in the initial

Table 2 Options for inducing therapeutic amenorrhea

Medication	Dosing	Frequency	Limitations	Amenorrhea	Advantages	Disadvantages
Continuous combined oral contraceptives (COCs)	Multiple formulations; monophasic formulations discarding placebo pills or dedicated packaging for extended cycle	Daily	BTB; other hormonal side effects;[28] risk of VTE[68]	~70% at 1 year with continuous use;[69] extended cycle use	Long history and clinical experience with both cyclic and extended use	Daily compliance required; variable duration of menstrual suppression before BTB
Transdermal combination contraceptives	Patch used continuously or extended cycle	Weekly	Similar to COCs;[28] skin reaction; possible increased risk VTE cf with COC[70]	Extended 84/7 cycle fewer days of BTB than monthly use[25]	Weekly compliance easier than daily COCs	Risks of VTE; little data regarding continuous use
Vaginal contraceptive ring	Ring used continuously or extended cycle	Monthly	Similar to other combined methods	Rates of spotting not reduced with extended or continuous use compared with monthly use[71]	Monthly compliance easier than daily or weekly	Higher discontinuation rates because of BTB with both extended and continuous regimen
Depot medroxyprogesterone acetate (DMPA)	150 mg IM 104 mg sub-Q	Every 12 weeks	BTB; progestin related side effects; weight gain; reversible impact on bone density with prolonged use (>2 years)[72]	50%–60% at one year; ~70% at 2 years[73]	Every 12 weeks administration	Weight gain; potential impact on bone density (reversible)
Oral progestins	Varies by progestin, eg, norethindrone acetate 5 mg bid–tid; medroxyprogesterone acetate; megestrol up to 80 mg/d	Daily	Irregular bleeding; progestin-related side effects; adverse impact on lipids	Up to 76% with high dose progestins at two years[74]	May be useful if estrogens are contraindicated; oral dosing is adjustable compared to DMPA	Inconsistent achievement of amenorrhea; more expensive than COCs; need for consistent and strict compliance
GnRH analogs	Formulation-dependent: IM, subdermal implants, intranasal	Formulation-dependent: daily or more, to every 12 weeks	GnRH agonists have an initial stimulatory effect and bleeding prior to suppression; menopausal symptoms; impact on bone density with prolonged use	High rates	May provide ovarian protection from chemotoxic effects of chemotherapy[44,75,76]	Menopausal effects limit therapy but may be given with hormonal "addback" to minimize these side effects; very expensive; potential impact on bone density
Progestin-containing intrauterine system	Levonorgestrel release 20 μg per day	Five years	Initial BTB and possible hormonal effects improve with time	50% at 1 year;[77] 60% at 5 years[78]	Top tier contraceptive efficacy, with benefits demonstrated for medical conditions including heavy menstrual bleeding, endometriosis, adenomyosis, fibroids[30,79–81]	Initial expense and insertion-related pain/discomfort
Danazol	Typically 400–800 mg po per day[82]	Daily	Dose related: menopausal symptoms, weight gain, and androgenic side effects limit therapy[71,83]	High rates		More side effects than progestins; expensive

Abbreviations: BTB, breakthrough bleeding; cf, compare; po, orally; GnRH, gonadotropin-releasing hormone; IM, intramuscular; bid, twice daily; tid, three times daily; sub-Q, subcutaneous; VTE, venous thromboembolism.

few months after initiation. Rates of amenorrhea reflect amenorrhea in individuals who continued the hormonal method; irregular, unscheduled bleeding may have resulted in discontinuation, thus artificially raising the reported rates of amenorrhea. This limitation is of variable acceptability to women, and must be described fully with instructions to patients in order to provide a truly informed consent process, and in an effort to prevent premature discontinuation of the therapy. The author's sample instructions to patients are provided in Table 3. Sample instructions to patients are provided in Table 3. Factors that play a part in the selection of an option for menstrual suppression include the route of administration, frequency of use which impacts compliance and satisfaction, the presence of uncomfortable side effects, other effects of administration such as an improvement in acne, and factors such as cost or insurance coverage. Clinicians are challenged to work with their individual patients to find a therapy that will be efficacious in suppressing menstrual bleeding when clinical symptoms or medical conditions warrant an attempted induction of therapeutic amenorrhea.

Summary

Menstrual suppression can have considerable benefits in improving quality of life, and in ameliorating menstrual cycle-related exacerbations of menstrual symptoms/molimina as well as underlying catamenial worsening of underlying medical conditions. The most common factor limiting the use of therapeutic measures to effect menstrual suppression is breakthrough bleeding and imperfect rates of amenorrhea, although the experience of other side effects can also be problematic if this has not been adequately explained prior to initiating the therapy. In the past, clinicians have reserved the recommendation of menstrual suppression for severe symptoms or significant disease. With the advent of marketing of extended cycle regimens of combination oral contraceptives directly to consumers, women have become aware of the option to choose menstrual suppression or extended cycles based on their own preferences and experiences of uncomfortable or painful menstrual symptoms. The realities of menstrual suppression and, in particular, the relatively high initial rates of irregular and unscheduled spotting or bleeding need to be understood by both clinicians and by women who may be choosing this option. However, over time, high rates of amenorrhea can typically be achieved, and those who do not achieve complete amenorrhea with medical therapies can often benefit from a marked reduction in menstrual volume. Surgical therapies can often be avoided, particularly in younger women who wish to preserve child-bearing capabilities.

Table 3 Instructions to patients

1. No method of menstrual suppression is perfect. Irregular, unpredictable bleeding or spotting occurs in the initial months of treatment with all therapies. While this can be bothersome, it is usually not medically worrisome, doesn't mean that the treatment isn't working for birth control or that it won't eventually cause bleeding to stop.
2. Write down or record electronically all bleeding (with a menstrual-tracking application for smartphone or tablet) so that you and your clinician can discuss management at a follow-up visit.
3. Irregular bleeding and spotting almost always get better after the first 1–3 months of treatment, although it may take up to a year (or occasionally longer for some people) for most bleeding to stop.
4. Not all irregular bleeding is due to the effects of hormones, especially if your initial irregular bleeding has stopped. Sometimes bleeding can signal a sexually transmitted infection (STI) or other cause (such as polyps, or uterine growths like fibroids). Talk with your clinician and be tested for STIs if you are at risk.

Disclosure

Dr. Paula Hillard has been a consultant to Bayer Healthcare, and has served as a trainer for the use of the Nexplanon® subdermal implant (Merck). The author reports no other conflicts of interest in this work.

References

1. Edelman A, Gallo M, Jensen J, Nichols M, Schulz K, Grimes D. Continuous or extended cycle vs cyclic use of combined oral contraceptives for contraception. *Cochrane Database Syst Rev*. 2005;3:CD004695.
2. Dapunt O, Loewit K. [A form of therapeutic amenorrhea. Acyclic long-term therapy with so-called ovulation inhibitors in the same constant dosage]. *Z Geburtshilfe Perinatol*. 1966;166(1):72–86. German.
3. Laros RK Jr. Therapeutic amenorrhea in hematologic disorders. *Obstet Gynecol*. 1971;38(4):589–593.
4. Gladwell M. John Rock's Error. *The New Yorker*. Vol March 10, 2000. New York, New York: The New Yorker.
5. Kistner R. The treatment of endometriosis by inducing pseudopregnancy with ovarian hormones. *Fertil Steril*. 1959;10:539–556.
6. Coutinho EM, Segal SJ. *Is Menstruation Obsolete?* New York, NY: Oxford University Press; 1999.
7. Sulak PJ, Cressman BE, Waldrop E, Holleman S, Kuehl TJ. Extending the duration of active oral contraceptive pills to manage hormone withdrawal symptoms. *Obstet Gynecol*. 1997;89(2):179–183.
8. Thomas SL, Ellertson C. Nuisance or natural and healthy: should monthly menstruation be optional for women? *Lancet*. March 11, 2000;355(9207):922–924.
9. Edelman A. Menstrual nirvana: amenorrhea through the use of continuous oral contraceptives. *Curr Womens Health Rep*. 2002;2(6):434–438.
10. Kaunitz AM. Menstruation: choosing whether … and when. *Contraception*. 2000;62(6):277–284.
11. Nelson AL. The pill at 40–a new look at a familiar method. Whose pill is it, anyway? *Fam Plann Perspect*. 2000;32(2):89–90.
12. Loudon NB, Foxwell M, Potts DM, Guild AL, Short RV. Acceptability of an oral contraceptive that reduces the frequency of menstruation: The tri-cycle pill regimen. *Br Med J*. 1977;2(6085):487–490.
13. Sulak PJ, Kuehl TJ, Ortiz M, Shull BL. Acceptance of altering the standard 21-day/7-day oral contraceptive regimen to delay menses and reduce hormone withdrawal symptoms. *Am J Obstet Gynecol*. 2002;186(6):1142–1149.

14. Cachrimanidou AC, Hellberg D, Nilsson S, Waldenstrom U, Olsson SE, Sikstrom B. Long-interval treatment regimen with a desogestrel-containing oral contraceptive. *Contraception*. 1993;48(3):205–216.
15. Miller L, Hughes J. Continuous administration of 100 ug levonorgestrel and 20 ug ethinyl estradiol: a randomized controlled trial. *Obstet Gynecol*. 2002;99(Suppl):771–778.
16. Wiegratz I, Hommel HH, Zimmermann T, Kuhl H. Attitude of German women and gynecologists towards long-cycle treatment with oral contraceptives. *Contraception*. 2004;69(1):37–42.
17. Benagiano G, Carrara S, Filippi V. Safety, efficacy and patient satisfaction with continuous daily administration of levonorgestrel/ethinylestradiol oral contraceptives. *Patient Prefer Adherence*. 2009;3:131–143.
18. Glasier AF, Smith KB, van der Spuy ZM, et al. Amenorrhea associated with contraception–an international study on acceptability. *Contraception*. 2003;67(1):1–8.
19. Andrist LC, Hoyt A, Weinstein D, McGibbon C. The need to bleed: women's attitudes and beliefs about menstrual suppression. *J Am Acad Nurse Pract*. 2004;16(1):31–37.
20. Makuch MY, Osis MJ, Petta CA, de Padua KS, Bahamondes L. Menstrual bleeding: perspective of Brazilian women. *Contraception*. 2011;84(6):622–627.
21. Schlaff WD, Lynch AM, Hughes HD, Cedars MI, Smith DL. Manipulation of the pill-free interval in oral contraceptive pill users: the effect on follicular suppression. *Am J Obstet Gynecol*. 2004;190(4):943–951.
22. Legro RS, Pauli JG, Kunselman AR, et al. Effects of continuous versus cyclical oral contraception: a randomized controlled trial. *J Clin Endocrinol Metab*. 2008;93(2):420–429.
23. Anderson FD, Feldman R, Reape KZ. Endometrial effects of a 91-day extended-regimen oral contraceptive with low-dose estrogen in place of placebo. *Contraception*. 2008;77(2):91–96.
24. Society for Menstrual Cycle Research. *Menstrual Suppression*. Fredonia, NY: Society for Menstrual Cycle Research; 2007. Available from: http://menstruationresearch.org/wp-content/uploads/2009/07/SMCRposition06082007.pdf. Accessed 28 May, 2014.
25. Stewart FH, Kaunitz AM, Laguardia KD, Karvois DL, Fisher AC, Friedman AJ. Extended use of transdermal norelgestromin/ethinyl estradiol: a randomized trial. *Obstet Gynecol*. 2005;105(6):1389–1396.
26. Brache V, Payan LJ, Faundes A. Current status of contraceptive vaginal rings. *Contraception*. 2013;87(3):264–272.
27. Kerns J, Darney P. Vaginal ring contraception. *Contraception*. 2011;83(2):107–115.
28. Jacobson JC, Likis FE, Murphy PA. Extended and continuous combined contraceptive regimens for menstrual suppression. *J Midwifery Womens Health*. 2012;57(6):585–592.
29. Bahamondes L, Bahamondes MV. New and emerging contraceptives: a state-of-the-art review. *Int J Womens Health*. 2014;6:221–234.
30. Matteson KA, Rahn DD, Wheeler TL 2nd, et al. Nonsurgical management of heavy menstrual bleeding: a systematic review. *Obstet Gynecol*. 2013;121(3):632–643.
31. US Food and Drug Administration. *FDA Bulletin*. Oct 1972.
32. Lin K, Barnhart K. The clinical rationale for menses-free contraception. *J Womens Health (Larchmt)*. 2007;16(8):1171–1180.
33. Wong CL, Farquhar C, Roberts H, Proctor M. Oral contraceptive pill for primary dysmenorrhoea. *Cochrane Database Syst Rev*. 2009;(4):CD002120.
34. Johnson NP, Hummelshoj L; World Endometriosis Society Montpellier Consortium. Consensus on current management of endometriosis. *Hum Reprod*. 2013;28(6):1552–1568.
35. Brown J, Kives S, Akhtar M. Progestagens and anti–progestagens for pain associated with endometriosis. *Cochrane Database Syst Rev*. 2012;3:CD002122.
36. Legro RS, Arslanian SA, Ehrmann DA, et al. Diagnosis and treatment of polycystic ovary syndrome: an endocrine society clinical practice guideline. *J Clin Endocrinol Metab*. 2013;98(12):4565–4592.
37. Johnson SR. Premenstrual syndrome, premenstrual dysphoric disorder, and beyond: a clinical primer for practitioners. *Obstet Gynecol*. 2004;104(4):845–859.
38. Clayton AH. Symptoms related to the menstrual cycle: diagnosis, prevalence, and treatment. *J Psychiatr Pract*. 2008;14(1):13–21.
39. Rapkin AJ, Lewis EI. Treatment of premenstrual dysphoric disorder. *Womens Health (Lond Engl)*. 2013;9(6):537–556.
40. Elliott JE, Abduljabar H, Morris M. Presurgical management of dysmenorrhea and endometriosis in a patient with Mayer-Rokitansky-Kuster-Hauser syndrome. *Fertil Steril*. 2011;96(2):e86–e89.
41. Tan YH, Lethaby A. Pre-operative endometrial thinning agents before endometrial destruction for heavy menstrual bleeding. *Cochrane Database Syst Rev*. 2013;11:CD010241.
42. Sulak PJ, Scow RD, Preece C, Riggs MW, Kuehl TJ. Hormone withdrawal symptoms in oral contraceptive users. *Obstet Gynecol*. 2000;95(2):261–266.
43. Huq FY, Tvarkova K, Arafa A, Kadir RA. Menstrual problems and contraception in women of reproductive age receiving oral anticoagulation. *Contraception*. 2011;84(2):128–132.
44. Adegite EA, Goyal RK, Murray PJ, Marshal M, Sucato GS. The management of menstrual suppression and uterine bleeding: a survey of current practices in the Pediatric Blood and Marrow Transplant Consortium. *Pediatr Blood Cancer*. 2012;59(3):553–557.
45. Peyvandi F, Garagiola I, Menegatti M. Gynecological and obstetrical manifestations of inherited bleeding disorders in women. *J Thromb Haemost*. 2011;9 Suppl 1:236–245.
46. James AH, Kouides PA, Abdul–Kadir R, et al. Von Willebrand disease and other bleeding disorders in women: consensus on diagnosis and management from an international expert panel. *Am J Obstet Gynecol*. 2009;201(1):12. e11–e18.
47. Samuels-Reid J, Scott RB. Painful crises and menstruation in sickle cell disease. *South Med J*. 1985;78(4):384–385.
48. ACOG Committee Opinion No 580: von Willebrand disease in women. *Obstet Gynecol*. 2013;122(6):1368–1373.
49. Martin-Johnston MK, Okoji OY, Armstrong A. Therapeutic amenorrhea in patients at risk for thrombocytopenia. *Obstet Gynecol Surv*. 2008;63(6):395–402; quiz 405.
50. Kirkham YA, Allen L, Kives S, Caccia N, Spitzer RF, Ornstein MP. Trends in menstrual concerns and suppression in adolescents with developmental disabilities. *J Adolesc Health*. 2013;53(3):407–412.
51. Hillard PJ. Menstrual suppression with the levonorgestrel intrauterine system in girls with developmental delay. *J Pediatr Adolesc Gynecol*. 2012;25(5):308–313.
52. Coffee AL, Sulak PJ, Hill AJ, Hansen DJ, Kuehl TJ, Clark JW. Extended cycle combined oral contraceptives and prophylactic frovatriptan during the hormone-free interval in women with menstrual-related migraines. *J Womens Health (Larchmt)*. 2014;23(4):310–317.
53. Sulak P, Willis S, Kuehl T, Coffee A, Clark J. Headaches and oral contraceptives: impact of eliminating the standard 7-day placebo interval. *Headache*. 2007;47(1):27–37.
54. Verrotti A, D'Egidio C, Agostinelli S, Verrotti C, Pavone P. Diagnosis and management of catamenial seizures: a review. *Int J Womens Health*. 2012;4:535–541.
55. Stevens SJ, Harden CL. Hormonal therapy for epilepsy. *Current Neurology and Neuroscience Reports*. 2011;11(4):435–442.
56. Mattson RH, Cramer JA, Caldwell BV, Siconolfi BC. Treatment of seizures with medroxyprogesterone acetate: preliminary report. *Neurology*. 1984;34(9):1255–1258.
57. Case AM, Reid RL. Effects of the menstrual cycle on medical disorders. *Arch Intern Med*. 1998;158(13):1405–1412.
58. Ensom MH. Gender–based differences and menstrual cycle–related changes in specific diseases: implications for pharmacotherapy. *Pharmacotherapy*. 2000;20(5):523–539.
59. Simpson G, Roomes D, Humphrey MD. Anaphylactoid reactions associated with menstruation affecting two sisters. *Med J Aust*. 2001;175(8):415–417.
60. Schindler AE. Non–contraceptive benefits of oral hormonal contraceptives. *Int J Endocrinol Metab*. 2013;11(1):41–47.

61. Pereira–Vega A, Sanchez JL, Gil FL, et al. Premenstrual asthma and symptoms related to premenstrual syndrome. *J Asthma*. 2010;47(8):835–840.
62. Peikert T, Gillespie DJ, Cassivi SD. Catamenial pneumothorax. *Mayo Clin Proc*. 2005;80(5):677–680.
63. Ovalle F, Vaughan TB 3rd, Sohn JE, Gower B. Catamenial diabetic ketoacidosis and catamenial hyperglycemia: case report and review of the literature. *Am J Med Sci*. 2008;335(4):298–303.
64. Palomba S, Orio F Jr, Manguso F, et al. Leuprolide acetate treatment with and without coadministration of tibolone in premenopausal women with menstrual cycle-related irritable bowel syndrome. *Fertil Steril*. 2005;83(4):1012–1020.
65. Mulak A, Tache Y, Larauche M. Sex hormones in the modulation of irritable bowel syndrome. *World J Gastroenterol*. 2014;20(10):2433–2448.
66. Heinig J, Simon P, Weiss FU, Zimmer KP, Domschke W, Lerch MM. Treatment of menstruation-associated recurrence of hereditary pancreatitis with pharmacologic ovarian suppression. *Am J Med*. 2002;113(2):164.
67. Powell-Dunford NC, Cuda AS, Moore JL, Crago MS, Kelly AM, Deuster PA. Menstrual suppression for combat operations: advantages of oral contraceptive pills. *Womens Health Issues*. 2011;21(1):86–91.
68. Peragallo Urrutia R, Coeytaux RR, McBroom AJ, et al. Risk of acute thromboembolic events with oral contraceptive use: a systematic review and meta-analysis. *Obstet Gynecol*. 2013;122(2 Pt 1):380–389.
69. Miller L, Hughes JP. Continuous combination oral contraceptive pills to eliminate withdrawal bleeding: a randomized trial. *Obstet Gynecol*. 2003;101(4):653–661.
70. Lidegaard O, Nielsen LH, Skovlund CW, Lokkegaard E. Venous thrombosis in users of non-oral hormonal contraception: follow-up study, Denmark 2001–2010. *BMJ*. 2012;344:e2990.
71. Miller L, Verhoeven CH, Hout JI. Extended regimens of the contraceptive vaginal ring: a randomized trial. *Obstet Gynecol*. 2005;106(3):473–482.
72. Isley MM, Kaunitz AM. Update on hormonal contraception and bone density. *Rev Endocr Metab Disord*. 2011;12(2):93–106.
73. Schwallie PC, Assenzo JR. Contraceptive use – efficacy study utilizing medroxyprogesterone acetate administered as an intramuscular injection once every 90 days. *Fertil Steril*. 1973;24(5):331–339.
74. Molsa PK. Inducement of therapeutic amenorrhea in mentally retarded women: two-year follow-up study. *Am J Ment Defic*. 1986;90(5):591–593.
75. Wang C, Chen M, Fu F, Huang M. Gonadotropin-releasing hormone analog cotreatment for the preservation of ovarian function during gonadotoxic chemotherapy for breast cancer: a meta-analysis. *PLoS One*. 2013;8(6):e66360.
76. Chen H, Li J, Cui T, Hu L. Adjuvant gonadotropin–releasing hormone analogues for the prevention of chemotherapy induced premature ovarian failure in premenopausal women. *Cochrane Database Syst Rev*. 2011;(11):CD008018.
77. Hidalgo M, Bahamondes L, Perrotti M, Diaz J, Dantas-Monteiro C, Petta C. Bleeding patterns and clinical performance of the levonorgestrel-releasing intrauterine system (Mirena) up to two years. *Contraception*. 2002;65(2):129–132.
78. Ronnerdag M, Odlind V. Health effects of long-term use of the intrauterine levonorgestrel-releasing system. A follow-up study over 12 years of continuous use. *Acta Obstet Gynecol Scand*. 1999;78(8):716–721.
79. Abou-Setta AM, Houston B, Al-Inany HG, Farquhar C. Levonorgestrel-releasing intrauterine device (LNG-IUD) for symptomatic endometriosis following surgery. *Cochrane Database Syst Rev*. 2013;1:CD005072.
80. Kelekci S, Kelekci KH, Yilmaz B. Effects of levonorgestrel-releasing intrauterine system and T380A intrauterine copper device on dysmenorrhea and days of bleeding in women with and without adenomyosis. *Contraception*. 2012;86(5):458–463.
81. Kriplani A, Awasthi D, Kulshrestha V, Agarwal N. Efficacy of the levonorgestrel-releasing intrauterine system in uterine leiomyoma. *Int J Gynaecol Obstet*. 2012;116(1):35–38.
82. Shaw RW. A risk benefit assessment of drugs used in the treatment of endometriosis. *Drug Saf*. 1994;11(2):104–113.
83. Pinkerton JV. Pharmacological therapy for abnormal uterine bleeding. *Menopause*. 2011;18(4):453–461.