Menstrual Concerns and Intrauterine Contraception Among Adolescent Bariatric Surgery Patients

Jennifer B. Hillman, M.D., M.S.,¹ Rachel J. Miller, M.D.,² and Thomas H. Inge, M.D., Ph.D.³

Abstract

Objective: Adolescent obesity has dramatically increased in recent decades, and along with that so have other medical comorbidities, such as hypertension, diabetes, hyperlipidemia, nonalcoholic steatohepatitis, polycystic ovary syndrome (PCOS), and pseudotumor cerebri. Obesity and related comorbidities may be contraindications to hormonal contraception, making contraception counseling of morbidly obese adolescents more challenging. Obese adolescent females seeking bariatric surgery need effective contraception in the postoperative period. This study is designed to determine the acceptance rate of the levonorgestrel-releasing intrauterine device (IUD) and describe common menstrual problems in obese adolescent bariatric surgery patients.

Methods: This is a historic cohort study of adolescent females who underwent bariatric surgery over a 2-year period at a tertiary referral center for pediatric obesity. Data were systematically abstracted. The percent of patients with menstrual problems and the acceptance rate for the levonorgestrel-releasing IUD were determined.

Results: Twenty-five adolescents met inclusion criteria. The mean age was 17.4 years (standard deviation [SD] 2.6), and the mean body mass index (BMI) was 51.4 (SD 6.3) kg/m². Eighty-four percent were white. Twenty-eight percent had menorrhagia, 32% had oligomenorrhea, 40% had dysmenorrhea, and 36% had PCOS. Ninety-two percent (23 of 25) underwent IUD placement.

Conclusions: There was a high prevalence of menstrual problems among this sample of severely obese adolescent females. The majority accepted the IUD, indicating it is a viable option among this population.

Introduction

MORE THAN 18% OF CHILDREN AND ADOLESCENTS in the United States aged 6–19 are considered obese, defined as having a body mass index (BMI) for age and gender in the 95th percentile or greater.¹ As more children and adolescents have become overweight or obese, it has become apparent that obesity affects nearly every organ system, including the reproductive organs.^{2,3} For example, menstrual disorders, such as dysfunctional uterine bleeding, secondary amenorrhea, and polycystic ovary syndrome (PCOS), are increasingly recognized among severely obese adolescent females. In addition to the menstrual concerns, such medical comorbidities as hypertension, hypertriglyceridemia, pseudotumor cerebri, and increased risk of venous thromboembolic events can be contraindications for hormonal contraceptives, which adds to the complexity of addressing menstrual concerns and

providing contraception counseling for severely obese adolescents.^{4,5}

In the last decade, bariatric surgery has become an option for treatment of morbidly obese adolescents, and the number of bariatric procedures performed on adolescents increased 5-fold from 1997 to 2003⁶ and continues to increase. Current guidelines for bariatric surgery recommend avoidance of pregnancy for at least 1 year postoperatively.⁷ The American College of Obstetricians and Gynecologists (ACOG) recommends postponing pregnancy for 12–18 months after bariatric surgery.⁸ Although the risk of anovulatory infertility is high among women with obesity,⁹ loss of as little as 5% of excess body weight can restore ovulatory function in obese adult women with or without PCOS.¹⁰ Changes in self-esteem, body image, and increased fertility after bariatric surgery may in part account for an increase in unplanned pregnancies among adult¹¹ and adolescent females.¹² Roehrig et al.¹²

¹Division of Adolescent Medicine, Cincinnati Children's Hospital Medical Center and the University of Cincinnati College of Medicine, Cincinnati, Ohio.

²Pediatric and Adolescent Gynecology, Children's Hospitals and Clinics of Minnesota, Minneapolis, Minnesota.

³Department of General and Thoracic Surgery, Cincinnati Children's Hospital Medical Center and the University of Cincinnati College of Medicine, Cincinnati, Ohio.

documented a 12.8% pregnancy rate among a cohort ($n=47$) of adolescent females who underwent gastric bypass surgery, which was more than double the rate among their peers (www.odh.ohio.gov). Thus, it has become imperative that adolescent females undergoing bariatric surgery have comprehensive contraception counseling before surgery. Additionally, any other menstrual and reproductive health concerns among obese adolescents should be addressed.

Although there are numerous contraceptive options for healthy adolescents, the options for morbidly obese adolescent females may be limited by the presence of medical comorbidities and concerns about decreased efficacy of some methods with increasing obesity.^{13–15} When counseling patients in the perioperative period, one must consider the risk of perioperative venous thrombosis, possible postsurgical malabsorption,^{16,17} minimization of menstrual blood loss, and treatment of reproductive and obesity-related comorbidities (e.g., PCOS, dysfunctional uterine bleeding).^{18,19} Currently available contraceptive methods offer a range of contraceptive and noncontraceptive benefits. In terms of safety and efficacy in the severely obese adolescent, the levonorgestrel-releasing intrauterine device (IUD), the Mirena® IUD, appears to have a favorable profile compared to alternatives. In addition, insertion at the time of weight loss surgery is desirable in that it is convenient for the patients and ensures no unplanned pregnancies in the postoperative rapid weight loss period.

Acceptance and uptake of intrauterine contraception are a complex matter that involves cultural, financial, and educational factors.²⁰ In the United States in 2002, IUDs were used among 1.3% of women of reproductive age, or 2.1% of contraceptive women.²⁰ Less is known about the feasibility and acceptance among adolescents, especially among severely obese adolescents. In addition, with the increasing prevalence of severe obesity during adolescence comes an increase in relevant obesity-related comorbidities and obesity-related menstrual concerns. Therefore, the aims of this study were to evaluate (1) the prevalence of menstrual problems and related medical comorbidities and (2) the acceptance rate of the levonorgestrel-releasing IUD placed at the time of bariatric surgery among a sample of severely obese adolescents.

Materials and Methods

Using a clinical database, we identified all patients who underwent bariatric surgery at Cincinnati Children's Hospital Medical Center from November 1, 2006, through December 31, 2008. This time frame was chosen because in the fall of 2006, it became the standard practice that all females planning bariatric surgery receive contraception counseling by either a pediatric and adolescent gynecologist (R.J.M.) or an adolescent medicine physician (J.B.H.) before surgery. Exclusion criteria included being male, not seen by a pediatric and adolescent gynecologist or adolescent medicine physician before surgery, and hypothalamic amenorrhea causing long-term amenorrhea and infertility. There was no age requirement for inclusion in the study. Institutional Review Board approval for this retrospective review was obtained. All abstracted data were de-identified, so informed consent was waived.

Measures

Data were systematically abstracted from electronic and paper medical records by one researcher (J.B.H.) using a data

abstraction tool. Height (cm) and weight (kg) on the day of surgery were recorded. The presence of obesity-related comorbidities relevant to hormonal contraceptive use was recorded; these specifically included hypertension, anemia, dyslipidemia, and pseudotumor cerebri. The diagnosis of menstrual problems and the age at menarche per the adolescent medicine or pediatric and adolescent gynecologist consultant were recorded. These included PCOS, menorrhagia, dysmenorrhea, and oligomenorrhea. The diagnosis of PCOS was made using a clinical tool developed in the Division of Adolescent Medicine at Cincinnati Children's Hospital Medical Center that is based on the National Institutes of Health (NIH) definition of PCOS.²¹ Prior use of hormonal contraceptives and type of contraceptive were recorded. The adolescent's sexual orientation as heterosexual, homosexual, bisexual, unknown, or not recorded and prior sexual activity as "ever sexually active" were recorded.

During the defined time frame, two clinicians (R.J.M. and J.B.H.) provided gynecological consultation. Both clinicians provided objective clinical information about hormonal and nonhormonal contraceptive options (including the levonorgestrel-releasing IUD). Clinicians made it clear that the IUD was not a requirement for weight loss surgery. Written patient information about IUDs and a table listing nonpermanent prescription birth control methods with perfect use and typical use failure rates, advantages, disadvantages, and side effects were provided for the patients. Whether or not the adolescent consented to placement of the levonorgestrel-releasing IUD at the time of her bariatric procedure and reasons for declining (if known) were recorded. Finally, it was noted if the adolescent had an endometrial biopsy performed with the placement of her IUD.

Statistical analyses

The percentages of patients with relevant obesity-related comorbidities and menstrual problems and consenting to the levonorgestrel-releasing IUD at the time of bariatric surgery were calculated. Because of the large percentage of patients consenting to the IUD, we were not able to evaluate for factors related to acceptance.

Results

Thirty-one adolescents had bariatric surgery within the defined time frame. Two were excluded because they had hypothalamic amenorrhea. One patient was excluded because she was diagnosed with endometrial hyperplasia before surgery and had the levonorgestrel-releasing IUD inserted before surgery as treatment of her endometrial hyperplasia. Finally, 3 patients were not seen in consultation by adolescent medicine/gynecology physicians before their surgery. The study is focused on the outcomes of the remaining 25 patients.

The mean age of the patients was 17.4 years (standard deviation [SD] 2.6), and the majority were white (84%), with the rest black. The patients were severely obese, with a mean BMI of 51.4 kg/m² (SD 6.3). The mean age at menarche was 11.8 years (SD 1.6). All but 1 subject had a roux-en-y gastric bypass; the remaining subject had a sleeve gastrectomy.

The percentage of patients with relevant obesity-related comorbidities and menstrual problems was relatively high (Table 1). The most common obesity-related comorbidity was dyslipidemia (56%), and the most common menstrual prob-

TABLE 1. PERCENT OF PATIENTS WITH REPRODUCTIVE HEALTH OR RELEVANT OBESITY-RELATED COMORBIDITIES AMONG OBESE ADOLESCENT FEMALES SEEKING BARIATRIC SURGERY ($n = 25$)

Comorbidity	n (%)
Hypertension	8 (32)
Dyslipidemia	14 (56)
Anemia	2 (8)
Pseudotumor cerebri	2 (8)
Menorrhagia	7 (28)
Oligomenorrhea	8 (32)
Dysmenorrhea	10 (40)
Polycystic ovary syndrome	9 (36)
No menstrual problems ^a	4 (16)

Girls with hypothalamic amenorrhea were excluded from these analyses.

^aMenstrual problems include menorrhagia, oligomenorrhea, dysmenorrhea, and polycystic ovary syndrome.

lem was dysmenorrhea (40%). Half of the patients had previously used hormonal contraceptives (52%), with the most common being combined oral contraceptive pills (OCPs) (40%). Twenty-eight percent were sexually active before surgery, and the majority self-described as heterosexual (Table 2).

Ninety-two percent of the patients had a levonorgestrel-releasing IUD placed at the time of bariatric surgery. Of those who declined the IUD, 1 was taking progestin-only pills before surgery but discontinued them by 3 months postoperatively; 1 patient did not give a reason for declining but stated she was "never attracted to anyone." Five patients had an endometrial biopsy performed at the time of the IUD insertion because of clinical symptoms of abnormal uterine bleeding and, thus, concern for endometrial hyperplasia. All endometrial biopsies were negative for endometrial hyperplasia. Of note, at the time of the retrospective review in which all subjects were at least 6 months postoperative, only 1 patient experienced unanticipated expulsion of the IUD, and another patient requested the IUD be removed at an outside facility secondary to vaginal bleeding. There were no known serious side effects or complications related to the IUD (e.g., uterine perforation, pelvic inflammatory disease [PID]).

TABLE 2. USE OF CONTRACEPTIVES, SEXUAL ACTIVITY, AND SEXUAL ORIENTATION AMONG OBESE ADOLESCENT FEMALES SEEKING BARIATRIC SURGERY ($n = 25$)

Characteristic	n (%)
Ever sexually active (intercourse)	7 (28)
Ever used contraceptives	13 (52)
Ever using specific contraceptive	
Combined oral contraceptive pills	10 (40)
Progestin-only pills	5 (20)
Transdermal patch	1 (4)
Intravaginal ring	1 (4)
Sexual orientation	
Heterosexual	20 (80)
Homosexual	0 (0)
Bisexual	3 (12)
Not recorded	2 (8)

Discussion

Severely obese adolescent females seeking bariatric surgery constitute a group with significant menstrual problems and relevant obesity-related comorbidities, making contraceptive counseling more complex and challenging. Only one quarter of the patients were sexually active before surgery, and more than half had previously used hormonal contraceptives. There was an extremely high acceptance rate for insertion of the levonorgestrel-releasing IUD at the time of bariatric surgery, suggesting that this was considered a viable option by this group of adolescents. Importantly, there were no complications noted among the patients who received the IUD.

Menstrual problems and obesity-related health concerns

Adolescent females in this study demonstrated a high prevalence of menstrual problems. In general, considering the majority of the sample was white, they experienced an earlier age of menarche (11.8 years) compared to the mean age at menarche for the average white female in the United States (12.7–12.9 years).^{22,23} Earlier age of menarche is associated with an increased risk of breast and ovarian cancer, and increased developmental concerns (e.g., depression, delinquent behavior).^{24–27} Therefore, in addition to the increased psychosocial problems associated with obesity in children and adolescents,^{28–30} girls with earlier pubertal onset have an additional risk factor for psychological distress.^{24–27}

More than one third of the patients in the current study had a diagnosis of PCOS, which is much higher than the estimated prevalence of 4%–8% among adult women in the United States.^{31,32} Although slightly higher prevalence rates (9%–10%) have been demonstrated among obese populations in the United States,³³ the prevalence in this sample is more than three times as high as has been found previously. A Spanish study reported a 28.3% prevalence rate of PCOS among overweight and obese adult Spanish women.³⁴ Of note, the authors demonstrated that increasing severity of obesity was not associated with increasing likelihood of having PCOS.³⁴ Another important point that seems to be emerging is that obesity at an earlier age may be associated with a higher risk of developing PCOS.³⁵ Results of a large retrospective and cross-sectional study of adult women enrolled in the Longitudinal Assessment of Bariatric Surgery-2 study demonstrated that women who recalled being obese by age 18 years were more likely to report a history of PCOS and infertility and less likely to have had a prior pregnancy compared to women who became obese after the age of 18 years.³⁵ This may provide some explanation for the high prevalence of PCOS in this severely obese population of adolescents. Of note, the clinicians who evaluated the adolescents in the current study used similar criteria for diagnosing PCOS as was used in the referenced studies. Both clinicians (J.B.H. and R.J.M.) who performed the medical assessments of these subjects were members of a clinical division that uses a tool based on the NIH definition of PCOS to standardize the diagnosis across providers in the practice.²¹

In addition to earlier menarche and the high prevalence rate of PCOS, the adolescents in this study reported a high prevalence of oligomenorrhea, dysmenorrhea, and menorrhagia. The high rates of menstrual cycle disturbance are not surprising, given what is known about gonadal steroid hor-

mones and obesity. Obesity is associated with elevated levels of free androgens through increased peripheral aromatization of testosterone to estradiol in the fat tissues. In addition, obese women have decreased sex hormone-binding globulin (SHBG) levels,^{36,37} which causes increased levels of circulating or free testosterone. Finally, elevated insulin levels stimulate production of androgens in ovarian stromal tissue. These changes in the concentration of gonadal steroid hormones with obesity cause disruption of normal ovulation and irregular menstrual bleeding, which can be described as amenorrhea, oligomenorrhea, menorrhagia, menometrorrhagia, or dysfunctional uterine bleeding. In the short term, the menstrual problems can contribute to iron deficiency anemia, which among many things may affect the surgeon's choice of bariatric procedure (i.e., sleeve gastrectomy vs. gastric bypass). The long-term significance of obesity-related menstrual cycle disturbance is not known, but it can impact fertility and risk of endometrial hyperplasia and, ultimately, endometrial cancer.

Contraceptive use

The most commonly used form of contraception by the adolescents in the current study before bariatric surgery was combined (OCPs) (40%). This is not surprising, given the high prevalence of PCOS and menstrual disorders. However, there are increasing concerns about the efficacy of OCPs among obese women.^{13,14,38} There are also concerns about the use of OCPs perioperatively, specifically an increased risk of venous thromboembolism.^{39,40} The use of OCPs after malabsorptive bariatric procedures has also been questioned more recently because of concerns about absorption-related efficacy.^{41,42} Finally, the high prevalence of medical comorbidities that are relative or absolute contraindications to combined OCPs (e.g., hypertension, hyperlipidemia, and pseudotumor cerebri) require the clinician to carefully consider all contraceptive options.⁴ These and other concerns about commonly used forms of contraception among severely obese adolescents seeking bariatric surgery necessitate evaluation for feasibility and acceptability of IUDs or other forms of long-term reversible contraception.

Acceptance of levonorgestrel-releasing IUD

Despite the obvious advantages, long-term reversible contraceptives, such as IUDs, have been understudied in adolescent populations.⁴³ To our knowledge, no prior study has assessed acceptance rates of IUDs among adolescents. Two prior studies have evaluated young adult women's knowledge and attitudes toward intrauterine contraceptives.^{44,45} In a study of 144 single, sexually active, African American and white women aged 14–24 years, it is remarkable that only 40% had ever heard of IUDs.⁴⁵ In another study, 50% of pregnant women aged 14–25 years had ever heard of IUDs.⁴⁴ Furthermore, after a brief (3-minute) educational session about intrauterine contraception,⁴⁵ more than half of non-pregnant young adult women reported a positive attitude toward IUDs, and there was no difference between the younger (14–18 years) and the older (19–24 years) women. Thus, it is not entirely surprising that 92% of the adolescents in the current study consented to the levonorgestrel-releasing IUD. Another explanation for the high rate of acceptance of the IUD may be related to the medical complexity of patients

seeking bariatric surgery (i.e., contraindications) and a realistic perception of safe and efficacious options for contraception. A recent ACOG Committee Opinion statement recommended that IUDs be considered as first-line choices for nulliparous and parous adolescents and highlighted the safety and efficacy of IUDs in the adolescent population.⁴⁶ The current study demonstrates that IUDs are also feasible and acceptable among adolescents, particularly among a population with significant medical comorbidities. This is also important, given the recent publication from ACOG, which states that nonoral forms of contraception should be considered for bariatric patients because there is an increased risk of oral contraception failure after bariatric surgery secondary to a malabsorption component.⁴²

The current study has limitations. The sample size is relatively small. There have been no other reports addressing the acceptance of IUDs among adolescents, however, and this is a unique patient population. Therefore, although the results cannot be applied to all adolescent females, it offers some insight into the menstrual concerns among obese adolescents and some direction regarding contraceptive options. Finally, the patients were offered having the IUD placed while they were under anesthesia for weight loss surgery. This may have significantly affected the acceptance rate of the IUD, considering it alleviated the concern about acute pain related to the procedure. The providers in this practice recommended the IUD be placed while the patient was already under anesthesia for the bariatric procedure because of concerns about technical difficulties of placing IUDs in nulliparous women, body habitus, and the potential long-term impact of pain during a gynecological procedure in adolescence.

Conclusions

With the rise in pediatric and adolescent obesity, providers need to be aware of the menstrual problems that are comorbid with severe obesity. Addressing these menstrual concerns is becoming increasingly complex, as routine treatments may not be safe or efficacious in women with severe obesity. This study demonstrates that adolescent females are accepting of IUDs. Providers should consider each patient and her risks carefully and remain open to all available forms of contraception.

Acknowledgments

This research was supported by the National Institute of Health/Office of Research on Women's Health 1K12 HD051953 (J.B.H.) and by the National Institute of Diabetes and Digestive and Kidney Diseases U01 DK072493-01A1 (T.H.I.).

Disclosure Statement

The authors have no conflicts of interest to report.

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Address correspondence to:
Jennifer B. Hillman, M.D., M.S.
Assistant Professor of Pediatrics
Division of Adolescent Medicine
3333 Burnet Avenue, MLC 4000
Cincinnati, OH 45229

E-mail: jennifer.hillman@cchmc.org