Original Study

Uterine Length in Adolescents with Developmental Disability: Are Ultrasound Examinations Necessary before Insertion of the Levonorgestrel Intrauterine System?

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A B S T R A C T

Study Objective: (1) To determine if there are any differences in uterine length between adolescents with developmental disability (DD) compared with their normally developing (ND) peers that might necessitate ultrasonography before insertion of levonorgestrel intrauterine system (LNG-IUS) in patients with DD; and (2) to characterize the LNG-IUS insertion procedure in adolescents with disabilities.
Design, Setting, Participants, and Interventions: This was a retrospective cohort study of 223 female adolescents with or without DDs. Seventy-five adolescents had DD; 33 underwent intrauterine system insertion in the operating room and 42 did not. A comparative cohort of 148 ND adolescents who had pelvic ultrasound examinations for abnormal uterine bleeding were included. The study period was between January 2006 and July 2013 at the Hospital for Sick Children, Toronto, Canada. Cases were identified from surgical databases and medical records.
Main Outcome Measures: Mean uterine length on pelvic ultrasound, demographic characteristics (age, age at menarche, time from menarche to ultrasound, weight), and descriptive statistics on intrauterine system insertion.
Results: There was a statistically significant difference ($P = .03$) in uterine length between adolescents with and without DD (6.7 vs 7.1 cm). However, this was not a clinically significant difference because insertion of the LNG-IUS in patients with DD was successful in patients with uteri more than 5 cm long. There was no difference ($P = .97$) in uterine length of adolescents with DD whether they had LNG-IUS insertion or not (6.7 cm). Adolescents with DD were younger than adolescents without DD at time of ultrasound examination ($P = .01$). However, among patients with DD, those who underwent intrauterine system insertion were older ($P = .001$). Incidence of uterine anomaly in patients with DD is low (2.7%) and was the same as in ND adolescents. Rates of complications and expulsions were low and there were no failures of LNG-IUS insertion in adolescents with DD.
Conclusion: Routine pelvic ultrasound examinations are not necessary before insertion of the LNG-IUS for menstrual suppression in adolescents with DD. Renal abnormalities, obstructive symptoms, and very small stature might necessitate imaging. Insertion using anesthesia is often straightforward and successful with minimal complications.
Key Words: Developmental disabilities, Adolescent, Uterine length, Ultrasound, Intrauterine device or system, Levonorgestrel, Menstruation

Introduction

Menstrual management in adolescents with developmental disabilities (DDs) can be challenging for the adolescents as well as for their caregivers and families.[1] The most common gynecological complaints in this population are menstrual and pertain to needs for menstrual suppression, hygiene, caregiver burden, painful menses, and associated behavioral issues.[2] Canadian menstrual management options presented to patients with DD are similar to those offered to young women without disabilities, and include extended combined hormonal contraception such as the oral contraceptive pill and patch, or long-acting reversible contraceptives such as intramuscular progesterone and the levonorgestrel (LNG) intrauterine system (IUS).[3] Minimizing investigations before implementation of the most effective and efficient treatment plan would be beneficial.

LNG-IUS is an effective and increasingly popular method to suppress menstruation through amenorrhea in adolescents with DDs. In a retrospective study of 300 such patients, LNG-IUS inserted using general anesthesia or sedation was a first-line option in 2.8% of patients and second-line option in 19.2%.[2] Three other cohort studies have documented the acceptability, safety, and therapeutic advantages of this method.[4–6] A minimum uterine length measured using ultrasound and/or uterine sound of 5-6 cm was recommended for insertion by those authors and 6-10 cm using sounding as per the product monograph, although successful insertion has also been achieved in

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uteri of smaller size with successful insertion in 80% of the 5 patients with uterine lengths < 6 cm.[6] No previous studies have compared the average uterine length of adolescents with DD with normally developing (ND) adolescents.

Ultrasound before IUS insertion in ND adolescents is not routinely performed nor indicated in adult nulligravid women.[7] In our institution, there is variation in practice regarding preinsertion imaging in patients with DD. Potential reasons for ordering ultrasound examination include ensuring adequacy of uterine size before committing a patient and their family to the time and risks of a procedure using anesthesia, financial burden of the device cost, and operative time and costs. The primary aim (aim 1) of this study was to determine if there are any differences in uterine length, between adolescents with DD compared with their ND peers, that would necessitate preprocedure ultrasonography in patients with DD. In addition, the safety and success of IUS insertion for menstrual suppression in the subcohort of female adolescents with DD are described (aim 2). The ultimate goal of this study was to determine whether or not a pelvic ultrasound should be recommended before insertion of the LNG-IUS in a patient with DD.

Materials and Methods

This was a retrospective cohort study of 223 female adolescents with DD who underwent pelvic ultrasound for any indication (n = 75) and 148 adolescents without DD who underwent imaging for abnormal uterine bleeding (AUB) between January 2006 and July 2013, through the Pediatric and Adolescent Gynecology Clinic at the Hospital for Sick Children. Research ethics board approval was obtained (REB 1000039583).

Patients with DD were identified through an ambulatory diagnostic database with the diagnosis of menstrual suppression. Patients were included if they had a pelvic ultrasound for any reason. A comparison cohort of patients without DD who underwent pelvic ultrasound was obtained from a database of adolescents with AUB in the same institution during the same study period. Disabled adolescents referred for menstrual suppression were excluded from this comparison cohort, ensuring discrete data sets. In addition, the subset of patients who had DD and underwent insertion of 52 mg LNG-IUS were identified from the Hospital for Sick Children surgical database by searching for procedures coded as intrauterine device insertion. Twenty-six patients were included in a previously published study of a cohort of young women with DD who presented for menstrual management.[2] All patients without DD were excluded from this group.

Data regarding demographic characteristics, disability, uterine length, and operative details were collected from the patient electronic and paper medical record, including standardized IUS forms created and completed by gynecologists at our site. Uterine length was extracted from radiology reports. Uterine length is standardly defined as the measurement from the external cervical os to the uterine fundus using transabdominal ultrasound. Full bladder was encouraged.

Univariate and regression analyses were used to compare age, weight, time from menarche, and uterine length per ultrasound of adolescents with special needs to ND adolescents. Data analysis was performed using R version 3.0.2 (R Core Development Team [2011], Vienna, Austria). Descriptive statistics were used to describe the characteristics of the surgical procedures and outcomes in the cohort of patients who underwent LNG-IUS insertion.

Results

Demographic Characteristics

Two hundred twenty-three adolescents met the inclusion criteria for aim 1: 148 ND adolescents with AUB and 75 patients with developmental delay and any indication for ultrasound.

Mean age of the DD cohort with ultrasound was 14.2 years, which was younger ($P = .01$) than the 148 adolescents in the ND cohort with mean age of 15.0 years. There was no difference in age at menarche, time from menarche, or weight between the DD and ND groups, which were all normally distributed. None of the DD patients reported previous sexual activity whereas 12.2% of the ND group had engaged in sexual activity ($P < .01$; Table 1).

In the 75 adolescents with DD, all had some degree of cognitive disability and more than half also had physical disabilities. Medical conditions in these patients included global or nonspecified DD (50.7%), autism (25.3%), rare syndromes and/or congenital brain anomalies (20.0%), seizure disorder with other DD (18.7%), Down syndrome (16.0%), cerebral palsy (8.0%), chromosomal deletion disorders (5.3%), and fetal alcohol syndrome (1.3%). Patients might have had more than 1 medical comorbidity.

Indications for pelvic ultrasound imaging in the population with DD were heavy menstrual bleeding, dysmenorrhea, possible precocious puberty, consideration for IUS insertion, or infrequent menstrual bleeding.

Two of 75 patients with DD (2.7%) had uterine anomalies (didelphys with obstructed hemivagina) on imaging. Both had surgical intervention. Reasons for imaging for those 2 patients were suspected obstruction from pain and heavy menses. Four ND patients (2.7%) with AUB had minor anomalies (arcuate/septate, bicornuate, or atrophic uterus).

Comparing the 33 patients who underwent IUS insertion with the 42 adolescents with DD included in aim 1 who did not have LNG-IUS insertion, IUS insertion patients were older (15.2 years) and had undergone menarche later than those who did not have IUS (mean age 13.5 years old). There

Table 1
Comparison of Cohorts with and without Developmental Disability

Characteristic	Developmentally Disabled (n = 75)	Normally Developing (n = 148)	*P*
Mean age, years	14.2 ± 2.3	15.0 ± 2.0	.01
Mean age at menarche, years	11.6 ± 1.5	11.8 ± 1.5	.39
Mean time from menarche, years	2.7 ± 2.1	3.2 ± 1.9	.08
Mean weight, kg	57.1 ± 18.0	62.4 ± 18.9	.08
History of current or past sexual activity, n (%)	0 (0)	18 (12.2)	<.01