Complex Abdominal Pain in an Adolescent Female with a Mullerian Duct Anomaly: A Case Report

By Caleb R. Wenz*, MS IV; Morgan T. Sorensen*, MS IV; and Laurie Landeen, MD

Abstract

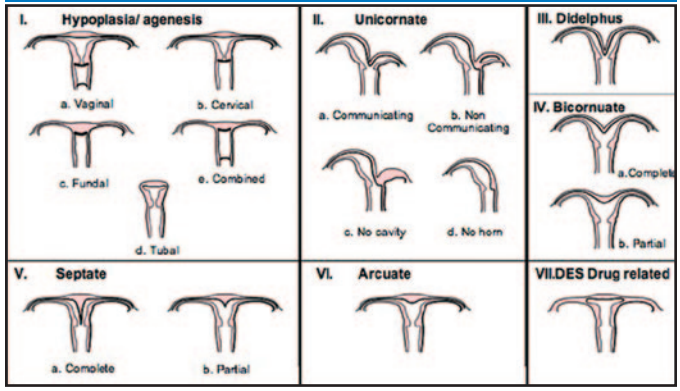
Uterine malformations occur early in embryogenesis due to abnormalities in development of paramesonephric (Mullerian) ducts. Mullerian duct anomalies can range from complete agenesis of the uterus to nonpathological variants (e.g., mildly arcuate uterus). This case study discusses an example of Herlyn-Werner-Wunderlich syndrome in an adolescent female with multiple congenital anomalies who presented with chronic, worsening abdominal pain and an enlarging mass in her lower left abdomen and pelvis. This case demonstrates the importance of a complete history and physical examination, appropriate imaging modalities, and an interdisciplinary approach to appropriately treat this patient.

Introduction

Uterine malformations are caused by abnormal development of the paramesonephric (Mullerian) ducts during embryogenesis which usually occurs after nine weeks gestation. Mullerian ducts are embryonically formed from mesoderm that runs laterally along the urogenital ridge and terminates in the sinus tubercle. These structures form the fallopian tubes, uterus, and the upper two-thirds of the vagina.[1] Mullerian defects are thought to be inherited by multifactorial mechanisms, rare cases of Mendelian inheritance and as a result of teratogen (diethylstilbestrol and thalidomide) exposure. Ranging from complete agenesis to non-pathologic variants, these uterine anomalies can be classified under seven subtypes according to the American Society of Reproductive Medicine (Figure 1). [2-4]

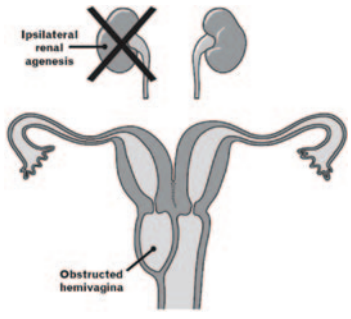
Herlyn-Werner-Wunderlich (HWWS), or obstructed hemivagina ipsilateral renal agenesis (OHVIRA) syndrome, is a rare Mullerian anomaly that often presents with severe dysmenorrhea, pelvic pain or an abdominal-pelvic mass. Figure 2 depicts this syndrome which is classically characterized by uterine didelphys, bicollis, obstructed hemi-vagina and renal agenesis.[1,5-8] A hematocolpos and hematometra develop behind the obstructed hemivagina soon after menarche resulting in pain and a pelvic mass. However, they usually have menstrual flow from the unobstructed hemivagina.

Figure 1. Classification of congenital uterine anomalies according to the American Fertility Society (currently named the American Society of Reproductive Medicine.



Republished with permission of British Institute of Radiology, from Mullerian duct anomalies: from diagnosis to intervention, Chandler TM, Machan LS, Cooperberg PL, Harris AC, Chang SD. The British Journal of Radiology. 20089;82(984):1034-1042. Permission conveyed through Copyright Clearance Center, Inc.

Figure 2. Image illustrating obstructed hemivagina, ipsilateral renal agenesis and uterine didelphys.



Permission granted by Sahab R, El-Desoky SM, Alsayyad A, Kurdi M, Kari JA. OHVIRA syndrome in an infant girl. Asian Journal of Pediatric Nephrology. 2019;2(2):88-90. Retrieved from www.ajpn-online.org/text.asp?2019/2/2/88/272306.

The purpose of this manuscript is to discuss a unique example of HWWS, review previous cases and demonstrate the importance of interdisciplinary medical decision making to successfully diagnose and manage HWWS.

Case Report

A 17-year-old female with a history of complex congenital anomalies was seen multiple times in a clinical setting over a three-month span for left lower quadrant abdominal and pelvic pain that was described as persistent, with acute, sharp episodes of increased severity which lasted one to two minutes. Menarche started at 12 years of age with irregular menses described as intermittent bloody/brown spotting without cyclicity nor days of heavier vaginal bleeding. The patient refused a trial of hormonal contraceptives to alleviate the pain. The patient was treated with antibiotics for urinary tract infections with no significant improvement in pain. Prior to her last emergency department visit, the pain was worsening and became intractable even with hydrocodone-acetaminophen. Associated symptoms included nausea with one episode of emesis, chills, and fevers up to 102 degrees F.

Her medical history is complex but significant for cloacal exstrophy, imperforate anus, uterine didelphys, pseudo-prune belly syndrome, congenital, solitary horseshoe kidney, recurrent urinary tract infections and preterm birth at 34 weeks. The patient's surgical history includes a Mitrofanoff vesicostomy and colostomy at five days old, repair of cloacal anomaly via anorectovaginoplasty, urethroplasty, and placement of an umbilical stoma at 9 to 10 months old and a left salpingectomy at 5 years old. She urinates via self-catheterization through her umbilical stoma and defecates by antegrade colonic enema daily.

Vital signs in the emergency department were stable and physical exam showed a tanner stage 5 female. Abdominal exam showed moderate tenderness, and genitourinary exam showed erythema and tenderness of the vulva, but no discharge, bleeding, or foreign body. Pregnancy and STD screen was negative. Complete blood count showed a leukocytosis of 24.6 K/µL (reference range: 4.0-11.0 K/µL), pelvic doppler ultrasound showed uterine didelphys and a 7.2 x 7.1 x 6.2 cm mass in the left lower quadrant (Figure 3). CT showed uterine didelphys, irregularity and thickening of the vaginal wall, and a complex 7.3 x 5.2 cm cystic and solid mass, consistent with an abscess, in the left limb of the uterine didelphys (Figure 4). The patient was admitted to the hospital and treated with doxycycline (100 mg IV every 12 hours) and cefoxitin (2000 mg IV every six hours).

A pelvic examination under anesthesia to drain the abscess was attempted, but a cervix/communication to the left horn was unable to be found. The patient was taken for a CT-guided, percutaneous drainage of the abscess by interventional radiology. A 12 French drain was placed and drained 15 ccs of brownish-gray, sludge-like purulent fluid. The drain continued to drain minimally over the next three days. Immediately, the patient's pain and nausea subsided.

Figure 3. Pelvic ultrasound with doppler. Uterine didelphys with complex 7.2 x 7.1 x 6.2 cm mass in left lower quadrant (yellow arrow).

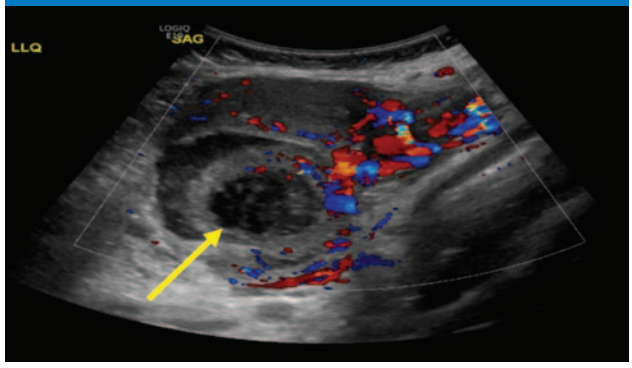
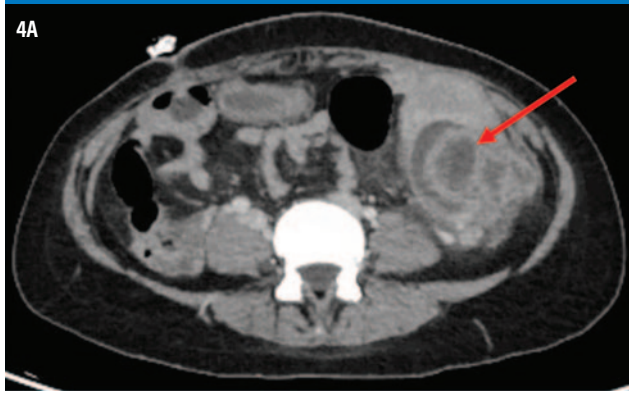
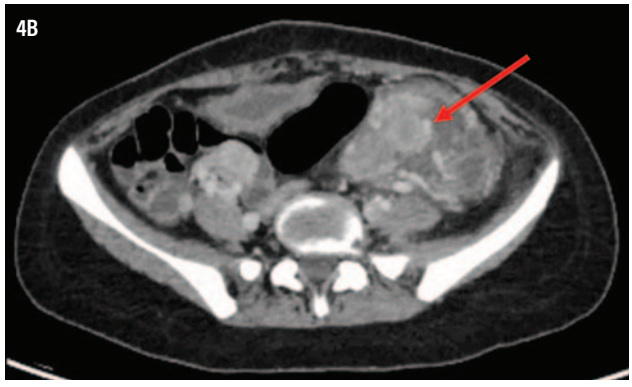


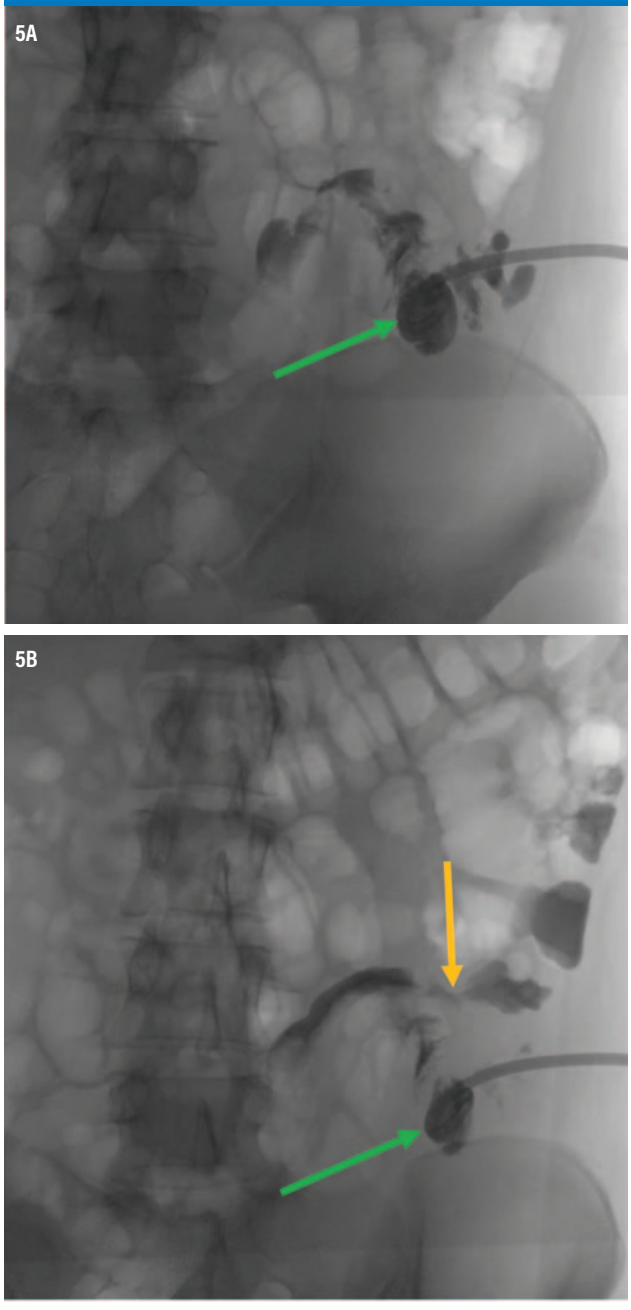
Figure 4A and 4B. CT visualization of left pelvic mass/abscess (red arrow).





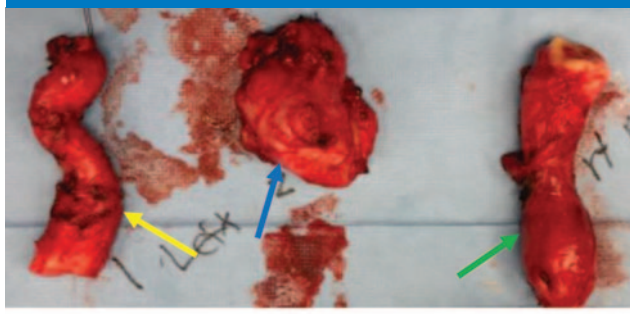
Culture of the purulent fluid grew *Escherichia coli*, *Proteus mirabilis*, *Actinomyces europaeus*, *Bacteroides fragilis*, and *Bacteroides thetaiotaomicron*, which raised concern for a colonic fistula. A few days later, CT was performed with injection of 40 cc of Omnipaque 300 contrast. The CT showed a collection in the left horn of the didelphys uterus with a fistula to the adjacent, distal descending colon (Figure 5). She was discharged home on amoxicillin-clavulanate for two weeks. She remained afebrile with decreased abdominal tenderness until her procedure the following month.

Figure 5A and 5B: CT with contrast injected into the abscess (green arrow). A fistula between the abscess and the distal colon is seen (orange arrow).



A one-time, prophylactic dose of gentamicin and clindamycin were given before surgery. The patient underwent cystoscopy, right salpingectomy, resection of the identified fistula and colon containing the fistula with primary re-anastomosis, and abdominal hysterectomy via laparotomy (Figure 6). A small, right ovary was identified and was not removed. Pathology report of the left Mullerian tissue found benign, proliferative uterine endometrium with some foci of inflammation, focal abscess, ovarian tissue with cystic follicles and fibrous adhesions. The specimen also contained a poorly developed endometrium around an unremarkable cervix. The right Mullerian tissue was normal uterine and cervical tissue with fibrous adhesions. The right salpinx showed hydrosalpinx and endometriosis. The segment of sigmoid colon that was resected showed benign tissue with inflammation, giant cells and serositis. The patient had an uneventful recovery and is without pain.

Figure 6. Mullerian structures removed during hysterectomy and right salpingectomy. The left shows the specimen made up of normal uterine tissue and cervix from the left uterine horn (yellow arrow). The middle shows the specimen made up of uterine tissue and the abscess (blue arrow). The right shows the specimen made up of normal uterine tissue and cervix from the right uterine horn (green arrow).



Discussion

This case discussed a 17-year-old female with chronic pelvic pain, significant past medical history for congenital genitourinary and gastrointestinal malformations and discordant twin phenotype. Many aspects of this case led to a successful outcome. First, because many obstructive genital conditions don't present until after puberty, a complete history must be asked regularly at all visits to prevent prolonged suffering, delayed diagnosis and further complications. Next, different imaging modalities are vital in diagnosis. Our patient underwent ultrasound due to its

absence of radiation, decreased cost, ability to visualize female reproductive anatomy and speed of use. CT and MRI were performed to reach the diagnosis and clarify any questions regarding anatomy, severity, and surgical approach. Third, whether it's alienation from self-catheterization, depression regarding infertility or decreased body image, or anxiety and stress over multiple surgical procedures and revisions, the patient's mental health is of utmost importance. Finally, interdisciplinary teamwork is imperative. Our case would not have been possible without effective planning between the gynecologists, pediatric surgeons, urologist, anesthesiologist, psychologist/psychiatrist and multiple other disciplines that were involved. The patient represents the need for future research into the etiology of congenital malformations, discordant twin phenotypes and evidence-based prenatal, postnatal and post-pubertal adolescent care for these conditions.

This patient's presentation was characteristic of Herlyn-Werner-Wunderlich syndrome. One theory is that the left horn of the uterine didelphys was functional but communicating with an obstructed hemivagina. Although our patient had a horseshoe kidney, OHVIRA typically presents with the obstructed hemivagina on the same side as the renal agenesis. Pathology report showed a cervical os on both the left and right sides, but only the right cervix was visible during pelvic exam. The non-patent hemivagina caused increasing discomfort due to obstruction of menstruation, which resulted in hematocolpos and hematometra. We suspect there may have been a slight perforation in the obstructed hemivagina that allowed spotting and minor discharge. An abscess was discovered and, after draining colonic bacteria, a fistula was suspected. Contrast was injected into the abscess after the patient was afebrile, had decreased tenderness and a normal white blood cell count. Possible risks associated with contrast injection of an abscess include septicemia, peritonitis, kidney injury, and hypersensitivity reactions.[9] These risks were reduced by using sterile technique and close post-operative monitoring. The benefits of using contrast seemed to outweigh the risks in this scenario.

It is suspected that the obstructed uterine horn, along with colonic bacteria transported through the fistula, resulted in the formation of the abscess. Another theory is that colonic bacteria ascended through a vaginal micro-perforation and entered the left uterine horn. The patient's decision was to perform a complete hysterectomy. She chose to remove the right uterine horn as well because it was primarily nonfunctional due to extensive adhesions. Future childbearing was discussed with the patient and her family, and she was reassured that surrogacy by her monozygotic twin would be a potential option. The right ovary was not removed because it was not involved and allowed the patient to avoid hormone therapy.

A previous case reported a 23-year-old female who presented with pelvic pain secondary to OHVIRA. The patient was found to have uterus didelphys, bicollis, obstructed hemi-vagina and right renal agenesis. Research has shown 60 percent of obstructed hemivagina with associated renal agenesis are on the right, and 72.4 percent of Mullerian abnormalities in HWWS present with uterus didelphys. The patient's diagnosis in our case was delayed due to her altered anatomy. Her umbilical stoma made urinary tract infections the most likely cause of the pain, while her displaced uterine horn presented higher and more laterally than originally expected. Post-menarche is a common time of symptom onset due to menstrual shedding that is unable to exit the obstructed hemi-vagina. Dysmenorrhea can complicate the diagnosis because it can be caused by endometriosis or other common diagnoses. Although rare, OHVIRA is an important differential to keep in mind when a patient presents with these complaints. In the 23-year-old, hematocolpos was the cause of her pelvic pain, which was resolved by septum excision, drainage and vaginoplasty.[10]

Another report of a female infant (46, XX) documented overlapping congenital conditions including pseudo-prune belly syndrome (pseudo-PBS), megacystis-microcolon-intestinal hypoperistalsis (MMIH), and omphalocele-exstrophy of the bladder-imperforate anus-spine abnormalities complex (OEIS). The specific criteria for PBS include abdominal muscle deficiency, urinary tract abnormalities, and cryptorchidism. The latter is why a female can't have this diagnosis. Pseudo-PBS has been used to describe females with this condition and includes hypoplastic abdominal muscles, urinary tract and genital anomalies (most often bicornuate uterus) and vaginal atresia. PBS has an incidence of 1:40,000 and 97 percent of these individuals are male. This depicts the rare occurrence in which 1:1,333,333 females will present with pseudo-PBS.[11]

In a third case, the patient presented with a large omphalocele, patent urachus, floppy abdominal wall musculature, pulmonary hypoplasia, polyhydramnios, non-functional left kidney and a persistent cloaca. The cloacal anomaly was repaired by creating a neovagina with an ileal interposition graft, removing the underdeveloped hemi-uteri/hemi-vagina due to adherence to the bladder trigone, ureteral

implantations and anorectoplasty.

Our patient had many features that overlapped between these other cases, indicating a common pathway in development. The hypothesis is that all three congenital abnormality cases discussed previously are due to failure of mesoderm to interact normally between infraumbilical mesoderm, urorectal septum and lumbosacral somites to form the abdominal wall, genitourinary tracts and lower gastrointestinal tracts.[11]

The prevalence of Mullerian dysgenesis ranges from 0.4 to 6.7 percent with many patients undiagnosed.[9] One question is why wasn't the monozygotic twin sister affected with the same abnormality? A retrospective cohort study found that twin gestations are 2.3 times more likely to have congenital anomalies when compared to singletons (6.5 vs. 2.8 percent). Congenital anomalies increase to 3.8 times more likely when limited to monochorionic twins (10.7 vs. 2.8 percent).[12] This shows that although the cause of phenotype discordance is not necessarily known, the incidence of one abnormal and one normal phenotype is not as rare as previously thought given the identical DNA monozygotic twins share.

Conclusion

This 17-year-old female's case, along with other cases discussed from the literature, depict a wide range of abnormalities and unique presentations, originating from common germ layers, that can make their diagnoses challenging. A thorough history and physical examination, multidisciplinary approach and further research into monozygotic twin phenotype discordance is pivotal to understanding and treating these disorders in the future.

*equal authorship

Consent was given by the patient and her family for publication of this case.

REFERENCES

1. Sajjad Y. Development of the genital ducts and external genitalia in the early human embryo. The Journal of Obstetrics and Gynaecology Research. 2011;36 (5): 929-37.
2. Wallach EE, Golan A, Langer R, Bukovsky I, Caspi E. Congenital anomalies of the Müllerian system. Fertility and Sterility. 1989;51(5):747-55
3. Buttram VC Jr., Gomel V, Siegler A, DeCherney A, Gibbons W, March C. The American Fertility Society classifications of adnexal adhesions, distal tubal occlusion, tubal occlusion secondary to tubal ligation, tubal pregnancies, Müllerian anomalies and intrauterine adhesions. Fertility and Sterility. 1988;49:944-55.

Please note: Due to limited space, we are unable to list all references. You may contact South Dakota Medicine at ereiss@sdsma.org for a complete listing.

About the Authors:

Caleb R. Wenz, MS IV, University of South Dakota Sanford School of Medicine, Sioux Falls, South Dakota.

Morgan T. Sorensen, MS IV, University of South Dakota Sanford School of Medicine, Sioux Falls, South Dakota.

Laurie Landeen, MD, Department of Obstetrics and Gynecology, University of South Dakota Sanford School of Medicine, Sioux Falls, South Dakota; Sanford Women's Health, Sioux Falls, South Dakota.