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Reproductive and Obstetric Outcomes in Patients with OHVIRA Syndrome: A Narrative Review

Aniela Figiel¹

ORCID <https://orcid.org/0009-0005-3461-294X>

E-mail figielaniela@gmail.com

¹The Regional Specialist Hospital in Olsztyn, ul. Żołnierska 18, 10-561 Olsztyn, Poland

Paweł Zaborek¹

ORCID <https://orcid.org/0009-0001-6433-0610>

E-mail Zabor620@gmail.com

¹The Regional Specialist Hospital in Olsztyn, ul. Żołnierska 18, 10-561 Olsztyn, Poland

Justyna Pestka¹

ORCID <https://orcid.org/0009-0009-3390-2979>

E-mail jus.pestka@gmail.com

¹The Regional Specialist Hospital in Olsztyn, ul. Żołnierska 18, 10-561 Olsztyn, Poland

Robert Marguła¹

ORCID <https://orcid.org/0009-0005-5984-9150>

E-mail Robert.margula01@gmail.com

¹The Regional Specialist Hospital in Olsztyn, ul. Żołnierska 18, 10-561 Olsztyn, Poland

Katarzyna Widomska²

ORCID <https://orcid.org/0009-0004-6955-6194>

E-mail k.widomska2cg@gmail.com

²National Medical Institute of the Ministry of the Interior and Administration, ul. Wołoska 137, 02-507 Warszawa, Poland Country

Mateusz Bernad²

ORCID <https://orcid.org/0009-0004-3793-1789>

E-mail mateusz.bernad.mail@gmail.com

²National Medical Institute of the Ministry of the Interior and Administration, ul. Wołoska 137, 02-507 Warszawa, Poland Country

Corresponding Author

Aniela Figiel, E-mail figielaniela@gmail.com

ABSTRACT

Background. Obstructed hemivagina and ipsilateral renal anomaly (OHVIRA) syndrome is a rare congenital malformation of the female urogenital tract. Although its anatomical features, diagnostic and surgical approaches are well described, its impact on reproductive and obstetric outcomes is not yet fully established.

Aim. To review the available literature and summarize the impact of OHVIRA syndrome on fertility and obstetric outcomes.

Material and methods. A narrative review of the literature was conducted using PubMed and Google Scholar database. Studies published within the last 5 years were screened. Inclusion criteria comprised observational studies and case series including at least three patients with a confirmed diagnosis of OHVIRA/HWW syndrome and reported reproductive outcomes. Five studies providing the most comprehensive and comparable data were included in the analysis.

Results. A total of 562 patients with OHVIRA syndrome were analyzed. Among women attempting conception, infertility rates ranged from 0% to 36%. Overall, 120 pregnancies were reported in 56 women. The live birth rate was 48.3%, with substantial heterogeneity across studies. The majority of pregnancies were implanted in the uterus contralateral to the obstructed hemivagina. Obstetric complications included miscarriage, intrauterine growth restriction (IUGR), preterm birth, breech presentation, and cesarean deliveries were more frequent than in the general population. Endometriosis and pelvic inflammatory disease were commonly reported and may negatively affect reproductive outcomes.

Conclusions: OHVIRA syndrome, although rare, has important implications for reproductive health. While fertility may be preserved in many patients, pregnancy outcomes appear less favorable, with an increased risk of obstetric complications. Early diagnosis and timely surgical management are crucial to optimize reproductive potential.

Keywords: OHVIRA syndrome, Herlyn–Werner–Wunderlich syndrome, obstructed hemivagina, uterine didelphys, fertility, reproductive outcomes, pregnancy outcomes

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1. Introduction

Obstructed hemivagina and ipsilateral renal anomaly (OHVIRA) syndrome is a rare congenital malformation of the female urogenital tract. The first case of obstructed hemivagina associated with uterine didelphys was reported by Purslow in 1922 (1). In the 1970s, Herlyn and Werner, as well as Wunderlich, further described a complex of genital malformations associated with ipsilateral renal agenesis (2,3). The triad of obstructed hemivagina, uterine didelphys, and ipsilateral renal agenesis became known as Herlyn–Werner–Wunderlich (HWW) syndrome.

The term OHVIRA, introduced by Smith and Laufer in 2007, encompasses a broader spectrum of uterine and renal anomalies and is currently preferred as a unifying classification (4). The exact incidence of OHVIRA syndrome remains unknown. The variability in reported estimates likely reflects underdiagnosis and the scarcity of high-quality epidemiological studies (5–8). Clinically, the syndrome is most often diagnosed during adolescence, after menarche typically presenting with cyclical pelvic pain, amenorrhea, or complications related to obstructed menstrual flow (9–12).

The majority of the available evidence derives from single case reports or small case series. Although studies including larger cohorts have been published, research has predominantly focused on diagnostic approaches and surgical management. Comprehensive studies specifically evaluating the impact of OHVIRA syndrome on reproductive and obstetric outcomes remain scarce and inconclusive.

The aim of the present study was to review the available literature and summarize the reported impact of OHVIRA syndrome on fertility as well as reproductive and obstetric outcomes.

2. Research materials and methods

2.1. Data collection

This study was conducted as a narrative review of the literature. A search of the PubMed database was performed, with Google Scholar used as a supplementary source to identify relevant publications on OHVIRA/HWW syndrome reporting reproductive outcomes. The inclusion criteria were as follows: (1) publication within the last 5 years; (2) articles published in English; (3) retrospective or prospective observational study design; (4) case series including ≥ 3 patients; (5) confirmed diagnosis of OHVIRA/HWW syndrome; and (6) reporting reproductive outcomes such as fertility, pregnancy, or obstetric outcomes. The exclusion criteria were: (1) case series including < 3 patients; (2) review articles; (3) studies addressing congenital obstructive genital tract anomalies other than OHVIRA/HWW syndrome. Studies

were selected based on the availability of comparable and consistently reported reproductive outcomes, enabling comparison of pregnancy rates, infertility rates, obstetric outcomes, and pregnancy-related complications across studies. Titles, abstracts, and full texts were screened, and five studies providing the most comprehensive data were selected for analysis (Table 1).

2.2. AI.

In this study, artificial intelligence (AI) was used for text analysis of clinical reasoning narratives in order to identify linguistic patterns associated with specific logical fallacies. AI supported the refinement of the manuscript’s academic English, ensuring clarity, consistency, and adherence to scientific writing standards. AI was also employed for additional linguistic polishing, including improvements in grammar, style, and the clarity in presentation of result. It is important to emphasize that all AI tools were used strictly as assistive instruments under human supervision. The final interpretation of results, classification of errors, and formulation of conclusions were carried out by experts in clinical medicine and formal logic. The role of AI was limited to enhancing the efficiency of data processing and linguistic refinement, rather than replacing human judgment in the analytical process.

3. Research results

Five case series were included, with sample sizes ranging from 3 to 415 patients. The studies originated from three continents: Asia, Europe, and North America. Most studies focused on reproductive outcomes following surgical management of the obstructed hemivagina, while preoperative fertility status was described in only one case series. In total, 562 patients with OHVIRA syndrome were analyzed (Table 1).

Table 1. Characteristics of included studies

Article	Continent of origin	Study design	Year of publication	ofData collection period	Postoperative fertility status	Total women n
Qi et al.	Asia	case series	2024	VI 2012-XII 2022	Yes	85
Dou et al.	Asia	case series	2025	I 2025-VII 2024	No	415
Candiani et al.	Europe	case series	2022	2008-2021	Yes	51
Erkkinen et al.	North America	case series	2023	2000-2022	Yes	8
Bunnell et al.	North America	case series	2024	1990-2021	Yes	3

A total of 120 pregnancies were recorded in 56 women. Reported infertility rates ranged from 0% to 36% across studies, with the highest rate observed in women evaluated prior to surgical management. Among women attempting conception, endometriosis was reported in 6 of 25 cases, and pelvic inflammatory disease (PID) in 9 of 22 cases. The use of assisted reproductive technology (ART) was reported in only three cases, and the available data were insufficient to evaluate the effects of this therapy. Reproductive and obstetric outcomes are presented in Table 2.

Table 2. Reproductive and Obstetric Outcomes

Pregnant Women	n	56
Infertility rate¹	range (%)	0-36,4
Total pregnancies	n	120
LBR²	n (%)	58 (48,3)
Miscarriages/Abortion	n (%)	62 (51,7)
Any use of ART³	n	3
Endometriosis⁴	n/N ⁶	6/25
PID^{4,5}	n/N ⁶	9/22
Total Endometriosis	n/N ⁶ (%)	124/503 (24,7)
Total PID⁵	n/N ⁶ (%)	130/503 (25,8)

¹ Infertility rate = pregnant women/women attempting conception

² Live birth rate (LBR) = live births/total number of pregnancies

³ Assisted reproductive technology (ART)

⁴ Among in women attempting conception

⁵ Pelvic inflammatory disease (PID)

⁶ Number of women with available data for the given parameter

The vast majority of pregnancies were implanted in the uterus contralateral to the obstructed hemivagina. Of the 120 pregnancies, only 58 resulted in live births. Considerable heterogeneity in live birth rates was observed across studies, ranging from 31% to over 72%. In the three studies that allowed calculation of live birth rate per woman, this rate exceeded 64%. Miscarriages or abortions were reported in 62 of 120 pregnancies (52%).

Among pregnancies with available outcome data, 27 of 91 resulted in term delivery, while 16 of 53 resulted in preterm delivery; no post-term deliveries were reported (Table 3).

Table 3. Pregnancy and delivery outcomes

Article	Preterm delivery n/N ¹ (%)	Term delivery n/N ¹ (%)	Cesarean Section n/N ² (%)	Vaginal delivery n/N ² (%)	Ipsilateral uterus pregnancy (%)	Contralateral uterus pregnancy (%)
Qi et al.	-	8/38 (21,1)	-	-	16%	84%
Dou et al.	-	-	9/9 (100)	0/9 (0)	-	-
Candiani et al.	8/22 (36,4)	8/22 (36,4)	14/16 (87,5)	2/16 (12,5)	25%	75%
Erkkinen et al.	6/23 (26,1)	9/23 (39,1)	10/15 (66,7)	5/15 (33,3)	-	-
Bunnell et al.	1/8 (12,5)	3/8 (25,0)	2/4 (50,0)	2/4 (50,0)	0%	100%
Total	15/53 (28,3)	28/91 (30,8)	35/44 (79,5)	9/44 (20,5)		

¹ Number of pregnancies with available data for the given parameter

² Number of live birth with available data for the given parameter

Caesarean section was the predominant mode of delivery (79,5%), whereas vaginal delivery accounted for 20,5% of reported cases. Documented obstetric complications included preeclampsia, intrauterine growth restriction (IUGR), breech presentation and preterm premature rupture of membranes (PPROM). A summary of adverse obstetric outcomes is provided in Table 4.

Table 4. Pregnancy complications and adverse obstetric outcomes

	n/N ¹ (%)
IUGR ²	4/31 (12,9)
Preeclampsia	2/15 (13,3)
PPROM ³	2/19 (10,5)
Breech presentation n/N	15/31 (48,4)

¹ Number of live birth with available data for the given parameter

² Intrauterine growth restriction (IUGR)

³ Preterm Premature Rupture of Membranes (PPROM)

4. Discussion

OHVIRA syndrome is a rare congenital anomaly with significant clinical implications, yet it is amenable to relatively simple surgical treatment when diagnosed in a timely manner (5,7,11–14). Although its characteristic features were first described over a century ago (1), research has primarily focused on diagnostic and therapeutic approaches. Magnetic resonance imaging (MRI) is currently considered the gold standard for diagnosis, providing excellent anatomical detail and enabling surgical planning (6,9,14). However, its limitations should be considered as

small communications between hemivaginas, such as fistulas or microperforations, may remain undetected on MRI (6,14).

Preferred surgical management involves minimally invasive and fertility-preserving procedures. More aggressive approaches, such as hysterectomy of the uterus ipsilateral to the obstructed hemivagina, should be avoided, given the documented potential for pregnancy in both uterine cavities (14,15). In our analysis, 25% of pregnancies implanted in the uterus ipsilateral to the obstruction, further supporting conservative management.

Reliable epidemiological data on OHVIRA syndrome remain limited and inconsistent. The exact prevalence of this syndrome remains controversial and is likely underestimated due to underdiagnosis. Its rarity and nonspecific clinical presentation may contribute to delayed or missed diagnosis (6,7,12). Moreover, long-term follow-up studies are scarce, and the association between OHVIRA syndrome and fertility or reproductive outcomes has not been clearly established. Although our review included 562 patients, only a small proportion attempted conception, resulting in 120 pregnancies. The available data were highly heterogeneous, which precluded direct comparison across studies. Consequently, certain parameters could only be assessed in selected cohorts.

The majority of publications suggest that overall fertility in women with OHVIRA syndrome is comparable to that of the general population (6,13,16,17). In contrast, Dou et al. reported a high rate of primary infertility (36.4%) among women attempting conception prior to treatment (7). In our cohort, the percentage of patients attempting conception who achieved at least one pregnancy ranged from 63,6% to 100%, whereas the overall live birth rate was relatively low (48,3%). These findings indicate that, although conception is possible, successful pregnancy outcomes remain less favorable.

Consistent with previous reports, our analysis demonstrates an increased risk of obstetric complications. Authors are in agreement that OHVIRA syndrome is linked to a higher frequency of miscarriage, intrauterine growth restriction (IUGR), preterm birth, breech presentation, and cesarean deliveries than in the general population (8,9,11,13–15,17). We also recorded preterm premature rupture of membranes (PPROM) in 2 cases, and retained products of conception, leading to chronic endometritis in one case (8,15). Across the analyzed studies, the pooled preterm birth rate (28,3%) was three times higher than that observed in the general population (13). This increased risk is considered to be a consequence of abnormal uterine

morphology and reduced uterine distensibility rather than cervical insufficiency (8,15). Consistent with previous publications, cesarean delivery was the predominant mode of delivery (79.5%) (8,9,13,15). OHVIRA syndrome itself does not constitute an absolute indication for cesarean section and vaginal delivery following appropriate surgical correction has been confirmed as safe (15).

Renal anomalies associated with OHVIRA syndrome may further complicate pregnancy. Unilateral renal agenesis has been linked to an increased risk of hypertensive disorders, including preeclampsia (8,9,13). In the analyzed cohort, preeclampsia and IUGR were observed as a complication of OHVIRA-related anomalies. These cases highlight the importance of early monitoring, including blood pressure, renal function, and maintaining vigilance in detecting IUGR among pregnant women with OHVIRA syndrome (13).

Endometriosis frequently coexists with a diagnosis of OHVIRA syndrome. The theory of endometriosis etiology considers retrograde menstruation to be the underlying mechanism in women with outflow obstruction malformations (5,6,13,15,18). The prevalence observed in our analysis exceeded that reported in the general population (6–10%) (19), which is consistent with findings from other studies (5–7,17). Dou et al. reported that endometriosis is more common in patients with complete obstruction, supporting the retrograde menstruation theory as a pathophysiological mechanism (7). Although the mechanisms underlying infertility in endometriosis remain unclear, it is widely accepted that endometriosis is strongly associated with reduced fertility (5,11,12,14,18,20). The possibility of early laparoscopic treatment of endometriosis has been considered; however, this approach has been largely rejected due to the risk of postoperative complications. Laparoscopy should be reserved as a last resort to preserve fertility (5,14). Surgical relief of the obstruction has been associated with regression of endometriotic lesions in most cases; however, persistence of disease has also been reported (5,6,10,14,15). These findings highlight the importance of early diagnosis of endometriosis in women, both before and after surgical correction, and the need for fertility-preserving therapeutic management (5,7).

Pelvic inflammatory disease (PID) represents another important complication, likely related to retained menstrual blood and retrograde flow (11,12). In the analyzed cohort, PID (25,8%) was observed slightly more frequently than endometriosis (24,7%) and reported more often in patients with incomplete obstruction (7). This condition placed patients at risk of developing

serious complications including subfertility; however, long-term data on reproductive outcomes in affected patients remain limited (6,7,11,15).

Finally, emerging evidence suggests a potential association between OHVIRA syndrome and an increased risk of malignancy. OHVIRA-associated malformations, together with coexisting risk factors (nulliparity, endometriosis, PID) may contribute to an elevated risk of ovarian malignancy (21). Additionally, previous studies have reported a possible association between OHVIRA syndrome and clear cell carcinoma (CCC) of the cervix, particularly on the previously obstructed side (17,22). The nonspecific clinical presentation of OHVIRA syndrome may obscure the presence of malignancy and delay diagnosis (21). Therefore, heightened oncological vigilance is warranted, including thorough evaluation and sampling of both cervixes during routine cervical cancer screening (15).

This study has several limitations. The available evidence is primarily based on small case series and retrospective data. Importantly, the existing literature is focused on clinical presentation, diagnostic management, and surgical approaches, whereas comprehensive data on long-term reproductive and obstetric outcomes remain scarce. Substantial heterogeneity in study design and outcome reporting precluded direct comparison across studies and limited the possibility of quantitative synthesis. These limitations highlight the need for cautious interpretation of the findings.

The findings of this review have important clinical implications. Timely diagnosis of OHVIRA syndrome is essential to prevent long-term complications, including endometriosis, PID, and impaired fertility. Management should involve a multidisciplinary approach, including gynecologists, radiologists, and, when necessary, oncologists.

Further research is needed to better understand the reproductive impact of OHVIRA syndrome. Standardized outcome reporting, including fertility and obstetric follow-up, would enhance comparability across studies and improve the quality of available evidence. In addition, prospective, multicenter studies with larger patient populations are required to provide more robust data.

5. Conclusions

OHVIRA syndrome, although rare, has significant implications for reproductive health. Early diagnosis and timely therapeutic management are essential for preserving fertility and preventing adverse obstetric outcomes. Endometriosis and pelvic inflammatory disease (PID) may negatively affect reproductive potential, particularly when diagnosis and treatment are delayed. Pregnancies in women with OHVIRA syndrome are associated with higher incidence of obstetric complications. Therefore, affected patients should receive appropriate fertility counseling and careful prenatal care. Clinicians should also be aware of the potential association between OHVIRA syndrome and malignancy. Further research is required to better define long-term reproductive and obstetric outcomes in this patient population.

Disclosure

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Author's Contributions:

Conceptualization: Aniela Figiel

Methodology: Aniela Figiel, Paweł Zaborek, Justyna Pestka, Robert Marguła, Katarzyna Widomska, Mateusz Bernad

Investigation: Aniela Figiel, Robert Marguła, Mateusz Bernad

Resources: Justyna Pestka, Katarzyna Widomska

Data curation: Paweł Zaborek

Writing - rough preparation: Paweł Zaborek, Justyna Pestka, Katarzyna Widomska

Writing - review and editing: Aniela Figiel, Mateusz Bernad

Visualization: Justyna Pestka, Katarzyna Widomska, Mateusz Bernad

Supervision: Aniela Figiel, Robert Marguła

Project administration: Robert Marguła, Paweł Zaborek

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Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT (OpenAI) to improve grammar and language correction. After using this tool, the authors have reviewed and edited the content as needed and accept full responsibility for the substantive content of the publication.

References

1. Purslow CE. A Case of Unilateral Hæmatokolpos, Hæmatometra and Hæmatosalpinx. *BJOG An Int J Obstet Gynaecol* [Internet]. 1922;29(4):643. Available from: <https://doi.org/10.1111/j.1471-0528.1922.tb16100.x>
2. Herlyn U, Werner H. [Simultaneous occurrence of an open Gartner-duct cyst, a homolateral aplasia of the kidney and a double uterus as a typical syndrome of abnormalities]. *Geburtshilfe Frauenheilkd*. 1971 Apr;31(4):340–7.
3. Wunderlich M. [Unusual form of genital malformation with aplasia of the right kidney]. *Zentralbl Gynakol*. 1976;98(9):559–62.
4. Smith NA, Laufer MR, D M. Obstructed hemivagina and ipsilateral renal anomaly (OHVIRA) syndrome : management and follow-up. 2007;87(4):0–4.
5. Liu Y, Li Z, Dou Y, Wang J, Li Y. Anatomical variations , treatment and outcomes of Herlyn - Werner - Wunderlich syndrome : a literature review of 1673 cases. 2023;(0123456789).
6. Qi J, Zhou P, Peng H, Deng J, Shao Y, Ye L, et al. Clinical and Imaging Characteristics of Herlyn-Werner-Wunderlich Syndrome : a Comprehensive Analysis. 2024;3343–50.
7. Dou Z, Song S, Gao Q, Guo J. Clinical characteristics of 415 patients with obstructed hemivagina and ipsilateral renal anomaly syndrome : A nationwide multicenter retrospective study. *J Pediatr Urol* [Internet]. 2025;21(6):1731–43. Available from: <https://doi.org/10.1016/j.jpuro.2025.04.029>
8. Erkkinen E, Farahzad MM, Brien KEO, Rosen MW. Original Article Pregnancy Outcomes in Patients with Obstructed Hemivagina Ipsilateral Renal Agenesis. *J Pediatr Adolesc Gynecol* [Internet]. 2023;36(6):545–8. Available from: <https://doi.org/10.1016/j.jpag.2023.07.008>

9. Candiani M, Vercellini P, Ferrero-caroggio C, Fedele F, Salvatore S, Fedele L. European Journal of Obstetrics & Gynecology and Reproductive Biology Conservative treatment of Herlyn-Werner-Wunderlich syndrome : Analysis and long-term follow-up of 51 cases. *Eur J Obstet Gynecol Reprod Biol* [Internet]. 2022;275(June):84–90. Available from: <https://doi.org/10.1016/j.ejogrb.2022.06.013>
10. Silveira SA, Laufer MR. Case Report Persistence of Endometriosis after Correction of an Obstructed Reproductive Tract Anomaly. *J Pediatr Adolesc Gynecol* [Internet]. 2013;26(4):e93–4. Available from: <http://dx.doi.org/10.1016/j.jpag.2013.01.002>
11. Vieira J, Almeida Q, Philip CE, Andreza T, Pereira R. Patient with Herlyn – Werner – Wunderlich syndrome and endometriosis achieves successful full - term pregnancy (40 weeks and 6 days): a case report. *J Med Case Rep* [Internet]. 2024;1–5. Available from: <https://doi.org/10.1186/s13256-024-04695-w>
12. Tuqan AR, Salahaldin RR, Abubaker ME, Zaben BA, Barabrah AM, Rayyan MH, et al. Case Reports in Women ’ s Health Successful pregnancy in a woman with Herlyn-Werner-Wunderlich syndrome : A case report and literature review. *Case Reports Women’s Heal* [Internet]. 2024;43(August):e00647. Available from: <https://doi.org/10.1016/j.crwh.2024.e00647>
13. Drever N, Gane C, Bailey M. European Journal of Obstetrics & Gynecology and Reproductive Biology Reproductive outcomes after surgical correction of congenital obstructive genital tract anomalies : A systematic review and quantitative pooled analysis of published data. *Eur J Obstet Gynecol Reprod Biol* [Internet]. 2026;320(December 2025):115014. Available from: <https://doi.org/10.1016/j.ejogrb.2026.115014>
14. Kudela G, Wiernik A, Droszol-cop A. Multiple variants of obstructed hemivagina and ipsilateral renal anomaly (OHVIRA) syndrome e one clinical center case series and the systematic review of 734 cases. 2021;
15. Bunnell ME, Cipres DT, Laufer MR. Case Series of Reproductive Outcomes after Surgical Correction of Obstructed Hemivagina in OHVIRA. 2024;26–30.
16. Tong J, Zhu L, Lang J. International Journal of Gynecology and Obstetrics Clinical characteristics of 70 patients with Herlyn – Werner – Wunderlich syndrome. *Int J Gynecol Obstet* [Internet]. 2013;121(2):173–5. Available from: <http://dx.doi.org/10.1016/j.ijgo.2012.11.023>
17. Moon L, O’Brien K, Dietrich J. OHVIRA: An In-Depth Review with Practical Applications for OBGYNs Worldwide. *Curr Obstet Gynecol Rep*. 2025 Oct 3;14.
18. Bonavina G, Taylor HS. Endometriosis-associated infertility : From pathophysiology to

- tailored treatment. 2022;(October):1–27.
19. Giudice LC, Kao LC. Endometriosis. 2004;
 20. Meuleman C, Vandenabeele B, Fieuws S, Ph D, Spiessens C, Ph D, et al. High prevalence of endometriosis in infertile women with normal ovulation and normospermic partners. *Fertil Steril* [Internet]. 2009;92(1):68–74. Available from: <http://dx.doi.org/10.1016/j.fertnstert.2008.04.056>
 21. Gonzales GA, Señeris AY. Ovarian malignancy in a patient with Herlyn – Werner – Wunderlich syndrome : A rare clinical presentation. 2025;258–62.
 22. Tanase Y. Clear Cell Carcinoma of the Cervix With OHVIRA Syndrome : A Rare Case Report. 2021;12(1):34–8.