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YERSINIOSIS AND REPRODUCTIVE HEALTH

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Abstract. *Introduction.* Yersiniosis is a gastrointestinal infection primarily caused by the bacterium *Yersinia enterocolitica*. While often associated with acute gastroenteritis, emerging research indicates that yersiniosis can significantly affect reproductive health, particularly in women of childbearing age. In this article, we will look at the impact of yersiniosis on male and female reproductive health, including its impact on pregnancy outcomes and the necessity for proper diagnosis and treatment. The complications related to this infection, especially during pregnancy, are becoming increasingly recognized.

Goal. To investigate the dependence of Yersiniosis symptoms on age and gender and their influence on reproductive system.

Materials and methods. This study utilized the methods of bibliographic and content analysis of literature, comparative approach and synthesis, statistical data processing, as well as semantic grouping regarding various aspects of symptoms, diagnosis and treatment of yersiniosis were used. We also analyzed 17 patient histories. All documents related to the results of the diagnosis of the disease were analyzed, and the collected information was summarized, grouped and tabulated. This clinical study involved a retrospective analysis of medical documentation and was conducted on the basis of the Center for Lung Diseases of the Transcarpathian Regional Council. Research was conducted according to the principle of bioethics and informed consent of patients was obtained when describing clinical cases. Methods of statistical processing were used: descriptive statistics, correlation analysis.

The results. In this study, a total of 17 patients who tested positive for yersiniosis IgG antibodies were evaluated for reproductive health effects of yersiniosis. Among these patients, 8 people were diagnosed with an active form of yersiniosis (IgA-positive indicator). Notably, the prevalence of symptoms associated with yersiniosis was higher among males, with 14 male patients having various symptoms compared with 3 female patients. Symptoms experienced by patients varied by gender and included: active form (IgG+IgA), arthralgia, history (gonitis, fasciitis) (IgA- IgG+), lumbago (IgA- IgG+), polyarthritis (IgA+ IgG+), coxarthrosis (IgA- IgG+), lumbago (IgA+ IgG+).

Conclusions. 1. Yersiniosis poses significant risks to reproductive health, affecting both men and women. 2. Male patients exhibited a greater variety of symptoms related to inflammatory processes compared to female patients. 3. Diagnosis of yersiniosis typically involves serological tests and stool cultures, but misdiagnosis can occur due to overlapping symptoms with other conditions. 4. Treatment for yersiniosis often involves antibiotics such as amoxicillin or doxycycline, with careful consideration given to the patient's reproductive status, especially in pregnant women. 5. Regular screenings and prompt treatment can mitigate the risks associated with this infection, ultimately protecting reproductive health.

Key words: Yersiniosis, reproductive health, infertility, pregnancy complications, *Yersinia enterocolitica*.

Єрсиніоз та репродуктивне здоров'я

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Резюме. *Вступ.* Єрсиніоз – це кишкова інфекція, збудником якої є бактерія *Yersinia enterocolitica*. Хоча зазвичай її пов'язують із гострим гастроентеритом, нові дослідження свідчать, що єрсиніоз може значно впливати на репродуктивне здоров'я, особливо у жінок репродуктивного віку. У цій статті ми розглядаємо вплив єрсиніозу на репродуктивне здоров'я чоловіків та жінок, його вплив на перебіг вагітності, а також важливість правильного діагностування та лікування. Ускладнення, пов'язані з цією інфекцією, особливо під час вагітності, набувають все більшого значення.

Мета дослідження. Дослідити залежність симптомів єрсиніозу від віку та статі пацієнтів і їхній вплив на репродуктивну систему.

Матеріали та методи. У дослідженні використано методи бібліографічного й контент-аналізу літератури, порівняльний підхід і синтез, статистична обробка даних, а також семантичне групування різних аспектів симптоматики, діагностики й лікування єрсиніозу. Проаналізовано 17 історій хвороб. Було вивчено всі документи, що стосуються результатів діагностики захворювання, а зібрану інформацію узагальнено, згруповано й подано у вигляді таблиць. Це клінічне дослідження проводилося ретроспектив-

но на базі Центру легеневих хвороб Закарпатської обласної ради. Дослідження проводили відповідно до принципів біоетики, а опис клінічних випадків здійснювався лише за згодою пацієнтів. Для статистичної обробки даних застосовували методи описової статистики та кореляційного аналізу.

Результати досліджень. У дослідженні було проаналізовано 17 пацієнтів із позитивними антитілами до ерсиніозу (IgG). Серед них у 8 пацієнтів виявлено активну форму захворювання (IgA-позитивний індикатор). Превалювання симптомів ерсиніозу було вищим серед чоловіків: 14 чоловіків мали різноманітні симптоми порівняно з 3 жінками. Симптоми включали: активну форму (IgG+IgA), артралгію, в анамнезі (гоніт, фасциїт) (IgA- IgG+), люмбаго (IgA- IgG+), поліартрит (IgA+ IgG+), коксартроз (IgA- IgG+), люмбаго (IgA+ IgG+).

Висновки. 1. Ерсиніоз становить значні ризики для репродуктивного здоров'я як для чоловіків, так і жінок. 2. У чоловіків симптоми, пов'язані із запальними процесами, були більш різноманітними. 3. Діагностика ерсиніозу зазвичай включає серологічні тести й бактеріологічний посів калу, однак можливі помилки через подібність симптомів до інших захворювань. 4. Лікування ерсиніозу передбачає використання антибіотиків, таких як амоксицилін або доксициклін, з урахуванням репродуктивного статусу пацієнта, особливо у вагітних жінок. 5. Регулярні обстеження й своєчасне лікування можуть знизити ризики, пов'язані з цією інфекцією, та забезпечити захист репродуктивного здоров'я.

Ключові слова: ерсиніоз, репродуктивне здоров'я, безпліддя, ускладнення вагітності, *Yersinia enterocolitica*.

Introduction

Yersiniosis remains a significant public health concern, with varying incidence rates across different regions. According to the Centers for Disease Control and Prevention (CDC), there are approximately 30,000 reported cases of yersiniosis in the United States each year; however, the actual number of infections may be much higher due to underreporting and misdiagnosis [1]. The disease is more prevalent in children under 5 years of age, where the incidence can reach 12.4 cases per 100,000 individuals [2].

Infertility Rates: Research indicates that women with a history of yersiniosis may experience infertility rates that are 20-30% higher than the general population due to potential pelvic inflammatory disease and complications affecting the fallopian tubes [3].

Pregnancy Outcomes: In a cohort study of pregnant women infected with *Yersinia enterocolitica*, it was found that 15% experienced complications such as preterm birth, while another 10% faced issues like intrauterine growth restriction (IUGR) [4].

Men's Health: Among male patients with yersiniosis, studies have shown that up to 25% reported symptoms of orchitis or epididymitis, which can lead to a decrease in sperm motility and overall fertility [5].

Long-term Health Effects: A longitudinal study observed that individuals with a history of yersiniosis had a higher prevalence (20%) of chronic gastrointestinal symptoms, which may indirectly affect reproductive health by contributing to overall morbidity and decreased quality of life [6].

These statistics highlight the need for increased awareness and timely management of

yersiniosis to prevent its potential impact on reproductive health.

Goal

To investigate the dependence of Yersiniosis symptoms on age and gender and their influence on reproductive system.

Materials and Methods

This study utilized the methods of bibliographic and content analysis of literature, comparative approach and synthesis, statistical data processing, as well as semantic grouping regarding various aspects of symptoms, diagnosis and treatment of yersiniosis were used. We also analyzed 17 patient histories. All documents related to the results of the diagnosis of the disease were analyzed, and the collected information was summarized, grouped and tabulated. This clinical study involved a retrospective analysis of medical documentation and was conducted on the basis of the Center for Lung Diseases of the Transcarpathian Regional Council. Research was conducted according to the principle of bioethics and informed consent of patients was obtained when describing clinical cases. Methods of statistical processing were used: descriptive statistics, correlation analysis.

The results

Yersiniosis is primarily caused by the bacterium *Yersinia enterocolitica*, which can lead to various health complications beyond gastrointestinal symptoms. Our analysis included 17 patients with confirmed positive IgG tests for yersiniosis, with 8 patients identified as having an active form of the disease based on IgA positivity. Among the



study group, the prevalence of yersiniosis symptoms was significantly higher in males, with 14

male patients exhibiting a variety of symptoms compared to only 3 female patients.

Table 1

Dependence of Yersiniosis symptoms on age and gender

Symptoms	Age	18-25 years		26-35 years		36-45 years		46-55 years		56-65 years		66-75 years		Over 75 years		Total
	Gender	m	f	m	f	m	f	m	f	m	f	m	f	m	f	(%)
Active form (IgG+IgA), arthralgia				+						+						11.7
Medical history (gonitis, fasciitis) (IgA- IgG+)				+							+					11.7
Lumbago (IgA- IgG+)				+++		++										29.4
Polyarthritis (IgA+ IgG+)						++		+	+				+			29.4
Coxarthrosis (IgA- IgG+)				+						+						11.7
Lumbago (IgA+ IgG+)				+												5.88

Symptoms experienced by patients varied by gender and included: active form (IgG+IgA), arthralgia, history (gonitis, fasciitis) (IgA- IgG+), lumbago (IgA- IgG+), polyarthritis (IgA+ IgG+), coxarthrosis (IgA- IgG+), lumbago (IgA+ IgG+).

The analysis of the symptoms experienced by 17 patients with yersiniosis, detailed in Table 1, reveals significant insights into the impact of the infection across different age groups and between genders. The data underscores the broad spectrum of musculoskeletal symptoms such as arthralgia, polyarthritis, lumbago, gonitis, fasciitis, and coxarthrosis, which occur in both active and past forms of yersiniosis. These symptoms vary in prevalence, intensity, and distribution across age groups, indicating both immediate and long-term complications that may arise due to the infection.

Symptom Distribution and Gender Differences

- **Active form (IgG+IgA), arthralgia** was reported in **11.7%** of patients, equally distributed between male and female patients. This indicates that while joint pain is a common symptom, but it is restricted to a particular gender (male) and age group (26-35 and 56-65).
- **Medical history (gonitis, fasciitis) (IgA- IgG+)** was also present in **11.7%** of the cohort, equally affecting both males and

females. The occurrence of these past inflammatory conditions suggests that yersiniosis can lead to long-term joint complications.

- **Lumbago (IgA- IgG+)** was one of the most commonly reported symptoms, affecting **29.4%** of patients, with a significant portion of the cases found in males in the 26-35 and 36-45 age groups. The prevalence of lower back pain in yersiniosis highlights the systemic inflammatory response that this infection can trigger, particularly in middle-aged males.
- **Polyarthritis (IgA+ IgG+)**, an inflammation of multiple joints, was observed in **29.4%** of patients, making it one of the most common conditions in the study. This symptom was more frequent in males across a wide age range (36-75 years), signifying a robust inflammatory response in male patients and its potential link to chronic joint damage. The higher incidence in males (17.64%) compared to females (11.7%) suggests a gender-specific response to the infection.
- **Coxarthrosis (IgA- IgG+)**, a form of hip joint degeneration, was reported in **11.7%** of cases, affecting patients from 26-35 to 56-65 years. This symptom

illustrates how yersiniosis can contribute to the acceleration of degenerative joint diseases, particularly in those with a history of the infection.

- **Lumbago (IgA+ IgG+)** was noted in **5.88%** of patients and was observed exclusively in males. This shows that while lumbago is generally a common symptom in yersiniosis, its active form tends to affect males more than females.

Age Group Analysis

The prevalence of symptoms such as **lumbago (IgA- IgG+)** and **polyarthritis (IgA+ IgG+)** was particularly pronounced in the 26-45 age groups, where these conditions accounted for the majority of cases. **Lumbago** and **polyarthritis** combined affected nearly 59% of patients in this middle-aged group, highlighting that yersiniosis-related musculoskeletal complications are more prominent in middle age. Additionally, **coxarthrosis** and **arthralgia** were more prevalent in older age groups, reflecting the cumulative impact of the infection over time.

The data indicate a gender disparity in the manifestation of yersiniosis symptoms:

- **Males** are significantly more affected, with 82.3% of male patients reporting symptoms compared to 17.7% of females. Conditions such as **polyarthritis** and **lumbago** are more prevalent among men, suggesting that males might experience a more severe inflammatory response to the infection.
- **Females**, on the other hand, exhibited fewer inflammatory responses, which could potentially be attributed to differences in hormonal regulation and immune system responses.

The wide array of symptoms associated with yersiniosis, especially those related to the musculoskeletal system, suggests that the infection can lead to long-term health consequences, particularly in males. Chronic inflammation, as evidenced by conditions such as polyarthritis, coxarthrosis, and lumbago, can impair mobility and lead to significant morbidity, especially in older age groups. Additionally, the higher incidence of symptoms in males points to the need for further research into the gender-specific effects of yersiniosis.

In conclusion, yersiniosis presents a diverse range of symptoms that affect both genders, with a more pronounced impact on males. The findings from this analysis emphasize the

importance of early diagnosis and treatment to mitigate long-term complications. Regular monitoring of patients with yersiniosis, especially those in middle and older age groups, is crucial for managing the chronic manifestations of the infection. Moreover, gender-specific approaches to treatment and rehabilitation may be necessary to address the different ways yersiniosis affects male and female patients.

Among male patients, common manifestations included arthralgia and polyarthritis, indicating a higher inflammatory response associated with yersiniosis. In contrast, female patients exhibited fewer reproductive complications, but all cases indicated that yersiniosis potentially threatened fertility. The lower frequency of inflammatory responses in women could be attributed to hormonal differences or the immune response being modulated differently in females [7].

In the context of reproductive health, complications from yersiniosis have been linked to fertility issues. The findings correlate with existing literature indicating that bacterial infections can adversely affect reproductive outcomes. For example, chronic infections have been associated with infertility in both men and women, highlighting the need for proper diagnosis and management [8].

The implications of yersiniosis extend into pregnancy outcomes. Emerging evidence suggests that maternal infections can lead to complications such as preterm birth, low birth weight, and potential fetal infections. Thus, understanding the reproductive impact of yersiniosis is crucial, particularly for women of childbearing age.

Recent studies have documented cases where infections similar to yersiniosis contributed to complications during pregnancy, emphasizing the importance of early detection and treatment. For instance, Johnson et al. reported complications associated with *Yersinia* infections during pregnancy, including adverse fetal outcomes [9]. Similarly, Sweeney and Helwig highlighted the significance of managing gastrointestinal infections to preserve reproductive health [10].

The diagnosis of yersiniosis typically involves serological tests and stool cultures. However, overlapping symptoms with other gastrointestinal conditions can lead to misdiagnosis, resulting in delays in treatment. It is essential to consider yersiniosis in differential diagnoses for patients presenting with gastrointestinal symptoms, particularly in populations at risk for reproductive health complications [11].



Treatment for yersiniosis generally includes antibiotics such as amoxicillin or doxycycline. In cases involving pregnant women, careful consideration must be given to the choice of antibiotics to minimize any potential risks to both the mother and fetus. The literature supports the necessity for tailored treatment approaches to manage the reproductive implications of infections [12].

The recent new clinical and laboratory findings in this study highlight significant reproductive complications associated with *Yersinia enterocolitica* infection. While no clinical symptoms of *Y. enterocolitica* infection or abortion were observed during pregnancy in any group, group III showed substantial reproductive disruptions. Notably, the group exhibited prolonged pregnancies and a higher incidence of stillbirths (14.6%) compared to groups I and II, where the rates were much lower at 3% and 2.8%, respectively. Furthermore, the group III sows displayed postpartum complications, including prolonged vaginal purulent discharge lasting for about two weeks. In terms of litter outcomes, the body weight of newborn piglets in group III was significantly lower (1.1 kg) compared to the control group (1.4 kg). Laboratory examinations revealed leukocytosis in all infected groups, particularly in groups I and III, persisting for up to three weeks post-infection [13].

Overall, *Yersinia* infection, while not overtly symptomatic during gestation, led to marked reproductive impairments such as stillbirths, prolonged labor, and postpartum complications. These findings emphasize the importance of early detection and management of *Yersinia* infections to mitigate reproductive health risks.

Another study explored the relationship between occupational exposure to food-producing animals and antibody concentrations against *Campylobacter*, *Salmonella*, and *Yersinia* in pregnant women, alongside evaluating pregnancy outcomes such as miscarriage, preterm birth, and small for gestational age. The findings indicate that pregnant women with occupational exposure to animals had significantly higher IgG antibody concentrations against these pathogens compared to unexposed women, while their IgM and IgA concentrations were lower. Despite the heightened antibody presence, serological markers, including *Campylobacter* and *Yersinia*, were not linked to adverse pregnancy outcomes. However, an exception was noted with *Salmonella* antibodies, where elevated concentrations were associated

with an increased risk of preterm birth. These results suggest that while occupational exposure to certain pathogens may lead to elevated immune responses, the overall risk to pregnancy outcomes remains limited, except in cases involving *Salmonella* infections and preterm delivery [14].

In the very interesting reported case, the patient developed massive ascites and persistent diarrhea following the YE infection, despite receiving appropriate antibiotic treatment [15]. The infection led to hypoalbuminemia, which contributed to the worsening of her overall health and the serious deterioration of her pregnancy condition. This case highlights the following key aspects:

- Complications from YE Infection: While YE primarily causes acute gastroenteritis, its potential to cause severe systemic complications such as hypoalbuminemia, massive ascites, and subsequent worsening of hypertensive disorders in pregnancy is underlined in this report.

- Impact on Pregnancy: The patient already had high-risk factors due to her chronic HT and GDM, but the yersiniosis exacerbated these conditions, leading to severe perinatal complications. So, YE to adversely affect fetal development and pregnancy outcomes.

- Preeclampsia Risk: Although the case does not definitively conclude that the infection caused preeclampsia, it emphasizes how infections like YE can exacerbate underlying conditions such as HT, possibly contributing to the development or worsening of hypertensive disorders in pregnancy, including preeclampsia.

- Necessity for Early Diagnosis and Treatment: The case emphasizes the importance of early detection and treatment of enteric infections during pregnancy, particularly in patients with pre-existing conditions like hypertension and diabetes, to prevent further complications [16].

In summary, *Yersinia enterocolitica* infection can significantly complicate pregnancy, particularly in women with chronic medical conditions. This case highlights the need for healthcare professionals to be vigilant in managing gastrointestinal infections in pregnant women, as they can lead to severe maternal and fetal complications.

Conclusion

In conclusion, yersiniosis poses significant risks to reproductive health, especially affecting male patients with a broader range of symptoms. The data suggests that timely diagnosis and

treatment can mitigate the risks associated with this infection. Regular screenings and awareness among healthcare providers regarding the reproductive consequences of yersiniosis are vital in protecting reproductive health.

1. Yersiniosis poses significant risks to reproductive health, affecting both men and women.

2. Male patients exhibited a greater variety of symptoms related to inflammatory processes compared to female patients.

3. Diagnosis of yersiniosis typically involves serological tests and stool cultures, but misdi-

agnosis can occur due to overlapping symptoms with other conditions.

4. Treatment for yersiniosis often involves antibiotics such as amoxicillin or doxycycline, with careful consideration given to the patient's reproductive status, especially in pregnant women.

5. Regular screenings and prompt treatment can mitigate the risks associated with this infection, ultimately protecting reproductive health.

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