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RECURRENT ENDOMETRIOSIS-ASSOCIATED PNEUMOTHORAX: CAUSES AND PREVENTION STRATEGIES

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The current definition of endometriosis is described as the presence of endometrioid tissue outside the uterus [10]. To establish a clinical diagnosis, foci of endometriosis are visualised, in particular through laparoscopic or thoracoscopic accesses, and pathological verification is performed. The complexity of such verification leads to problems in determining its prevalence, so its rates remain unclear. According to Shafrir et al. (2018), this value varies from 2-11% in women with no complaints to 5-21% among those hospitalised with pelvic pain [7].

About 12% of patients with endometriosis have its extragenital forms [4]. After the abdominopelvic cavity, the thoracic cavity is the second most common location of these foci. All manifestations of this localisation of endometriosis are combined into the thoracic endometriosis syndrome (TES). This syndrome includes catamenial pneumothorax (CP), catamenial haemothorax (CHt), catamenial haemoptysis (CH) and pulmonary nodules, as well as some other less common manifestations [4]. Endometrioid masses can be located in the lung parenchyma (including bronchi), pleura and diaphragm. TES is often combined with endometriosis of the urinary, reproductive and digestive systems. According to

Korom et al (2004), up to 50-84% of patients with TES also have pelvic endometriosis [1].

Due to the absence of a clearly established pathogenesis of endometriosis-associated pneumothorax (EAP), there are several theories of its development [6]. According to them, endometrioid growths arise in the thoracic cavity as a result of retrograde menstruation, metaplasia of the pleural and peritoneal mesothelium, or lymphatic and haematogenous dissemination of endometrial cells [2, 4]. EAP is directly caused by spontaneous rupture of subpleural blebs, peeling of endometrial inclusions from the peritoneal pleura with subsequent air release from the lungs, air entry from the genital tract through congenital or acquired (including as a result of peeling of endometrial implantations) diaphragmatic openings. In addition, during menstruation, the plasma concentration of prostaglandin F2α, which is a powerful bronchoconstrictor and vasoconstrictor, increases, which can cause rupture of the alveoli of pre-formed subpleural blood vessels and bullae with the symptoms of EAP [4, 6]. Manifestations of EAP usually occur between 24 hours before and 72 hours after the onset of menstruation in women of reproductive age, most often 35±0.6 years old [5].

Recurrent EAP significantly worsens the prognosis of patients and requires a competent multidisciplinary approach to it's diagnosis and treatment [1]. We have described a clinical case of recurrent EAP that highlights the typical problems associated with this pathology, including delayed diagnosis and inadequate initial treatment [3].

The cause of EAP recurrence is insufficient or incorrect diagnosis of endometrioid foci as main etiological factor and, as a result, inadequate combined treatment of endometriosis. The presented case describes the treatment of an 18-year-old woman with a primary diagnosis of bullous pulmonary emphysema complicated by right-sided haemothorax on the 4th day of the menstrual cycle. The first recurrence of pneumothorax occurred 11 months later on the right side and again 13 months later on the left side, both within 3 days of the onset of menstruation. Ineffective treatment was caused by an inadequate examination for endometriosis after the first case of EAP and an incomplete examination of the pleural cavity for endometrioid foci during the non-intubated video-assisted thoracic surgery (NIVATS) for the first case and recurrence. Thus, failure to detect and excise affected tissues, such as diaphragmatic fenestrations or endometrioid tissues on the pleural surface during VATS, is a significant cause of EAP recurrence [3, 6]. The absence or insufficient duration of hormonal therapy for endometriosis can lead to persistence of active endometrial foci [8].

Involvement of thoracic surgeons, gynaecologists, and endocrinologists in a multidisciplinary approach optimises the diagnosis and treatment of recurrent EAP

[3]. VATS should include a thorough examination of the pleural cavity and diaphragm for endometrioid foci and diaphragmatic fenestrae. Mechanical pleurodesis and excision of bullae or blebs are recommended to prevent pneumothorax [3, 5]. Prevention of EAP recurrence requires elimination of the underlying causes of the pathology, comprehensive surgical treatment and personalised hormonal therapy with long-term follow-up.

REFERENCES:

[1] Korom, S., Canyurt, H., Missbach, A., Schneiter, D., Kurrer, M. O., Haller, U., Keller, P. J., Furrer, M., & Weder, W. (2004). Catamenial pneumothorax revisited: clinical approach and systematic review of the literature. *The Journal of thoracic and cardiovascular surgery*, *128*(4), 502–508. https://doi.org/10.1016/j.jtcvs.2004.04.039

[2] Laganà, A. S., & Naem, A. (2022). The pathogenesis of endometriosis: Are endometrial Stem/Progenitor cells involved? In *Stem cell biology and regenerative medicine* (pp. 193–216). https://doi.org/10.1007/978-3-030-90111-0_9

[3] Moroz, V., Kovalchuk, O., Motliakh, V., & Babenko M. (2024). Features of diagnosis and treatment of Endometriosis-Associated Pneumothorax (Clinical case). *Tuberculosis Lung Diseases HIV Infection*, *4*, 68–74. https://doi.org/10.30978/tb2024-4-68

[4] Nezhat, C., Lindheim, S. R., Backhus, L., Vu, M., Vang, N., Nezhat, A., & Nezhat, C. (2019). Thoracic Endometriosis Syndrome: A Review of Diagnosis and Management. *JSLS : Journal of the Society of Laparoendoscopic Surgeons*, *23*(3), e2019.00029. https://doi.org/10.4293/JSLS.2019.00029

[5] Pratomo, I. P., Putra, M. A., Bangun, L. G., Soetartio, I. M., Maharani, M. A. P., Febriana, I. S., Soehardiman, D., Prasenohadi, P., & Kinasih, T. (2023). Video-assisted surgical diagnosis and pleural adhesion management in catamenial pneumothorax: A case and literature review. *Respirology case reports*, *11*(4), e01123. https://doi.org/10.1002/rcr2.1123

[6] Qavi, A., Basak, P., & Jesmajian, S. (2019). THORACIC ENDOMETRIOSIS SYNDROME PRESENTING AS RECURRENT CATAMENIAL PNEUMOTHORAX. *CHEST Journal*, *156*(4), A1428. https://doi.org/10.1016/j.chest.2019.08.1272

[7] Shafrir, A. L., Farland, L. V., Shah, D. K., Harris, H. R., Kvaskoff, M., Zondervan, K., & Missmer, S. A. (2018). Risk for and consequences of endometriosis: A critical epidemiologic review. *Best practice & research. Clinical obstetrics & gynaecology*, *51*, 1–15. https://doi.org/10.1016/j.bpobgyn.2018.06.001

[8] Tsuboshima, K., Kurihara, M., Okumura, G., Ohashi, K., Takahashi, K., Shiko, Y., Ozawa, Y., & Seyama, K. (2023). Postoperative hormonal therapies reduce the recurrence of thoracic endometriosis-related pneumothorax. *European journal of cardio-thoracic surgery : official journal of the European Association for Cardio-thoracic Surgery*, *64*(4), ezad331. https://doi.org/10.1093/ejcts/ezad331

[9] Velagapudi, R. K., & Egan, J. P. (2021). Thoracic Endometriosis: a Clinical Review and Update of Current and Evolving Diagnostic and Therapeutic Techniques. *Current Pulmonology Reports*, *10*(1), 22–29. https://doi.org/10.1007/s13665-021-00269-z

[10] Zondervan, K. T., Becker, C. M., & Missmer, S. A. (2020). Endometriosis. *The New England journal of medicine*, *382*(13), 1244–1256. https://doi.org/10.1056/NEJMra1810764