Endometriosis is an oestrogen-dependent disorder where endometrial tissue forms lesions outside the uterus, causing chronic inflammation and scarring. Women who have endometriosis may experience a highly variable range of non-specific signs and symptoms, including pelvic pain. Endometriosis is often misdiagnosed, partly because its signs and symptoms can easily be attributed to more common conditions that cause pelvic pain in women, resulting in delayed diagnosis and treatment. This article describes the pathophysiology, aetiology, risk factors for, and signs and symptoms of endometriosis. It also outlines how endometriosis should be investigated and treated in the emergency department (ED). Its aim is to support nurses to deliver effective care to women of reproductive age presenting to the ED with severe pelvic pain.
**Pathophysiology and aetiology**

Endometriosis is a chronic oestrogen-dependent inflammatory disorder in which endometrial tissue grows outside the uterus (Keeler et al 2020). Common areas for extra-uterine endometrial tissue growth within the pelvic cavity include the ovaries, the Fallopian tubes, uterosacral ligaments, bladder and bowel. Outside the pelvic cavity, endometrial lesions can be found in areas such as the diaphragm, umbilicus and inguinal ligaments (Kuznetsov et al 2017, Foti et al 2018). The reason why endometrial lesions can develop in different locations is largely unknown (Foti et al 2018). According to location, endometrial lesions can be classified as superficial or deep. They can increase in size and are unlikely to resolve on their own. Figure 1 shows endometrial tissue growth on the ovaries and fallopian tubes.

There are several theories, but no unifying explanation, of the aetiology of endometriosis (Kuznetsov et al 2017). Researchers do not know for certain why endometrial tissue may grow outside the uterus (Keeler et al 2020). Theories that have been proposed include genetic predisposition, metaplasia, lymphatic metastasis, overproduction of prostaglandins and altered immune function. However, no definitive unifying explanation has been found so far (Patel et al 2018, Konincx et al 2019). One theory is that in endometriosis extra-uterine tissue responds abnormally during menstruation, allowing endometrial tissue to shed and spread to the pelvic and abdominal cavities, which results in chronic inflammation and scarring (Konincx et al 2019).

**Risk factors**

Endometriosis occurs in women of reproductive age and its peak incidence is in women aged between 24 years and 29 years (Foti et al 2018). Two thirds of women who are eventually diagnosed with endometriosis report having experienced symptoms before the age of 20 years (Ballweg 2003). Despite the lack of certainty regarding the aetiology of endometriosis, several risk factors have been identified. It has long been recognised that there is a potential correlation between the development of endometriosis and menstrual patterns such as extended or heavy menstrual flow and/or hormonal changes such as those at play in premature menarche or late menopause (Keeler et al 2020). Women who have never used combined hormonal contraception and nulliparous women are at increased risk of developing endometriosis (Patel et al 2018). The use of combined hormonal contraception and previous pregnancy and lactation are thought to protect women against the risk of developing endometriosis (Farland et al 2017, Patel et al 2018).

Further risk factors include a family history of endometriosis and a past history of infertility, pelvic surgery and/or ovarian cysts (Agarwal et al 2019, Zondervan et al 2020). Diet and alcohol consumption have also been considered as risk factors for endometriosis, but it is challenging to determine the role they may play in the pathogenesis of the disorder because available data on their physiological implications are limited (Hemmert et al 2019).

**Signs and symptoms**

The signs and symptoms of endometriosis are highly variable and non-specific. The disorder often manifests as pelvic pain, dysmenorrhoea and bleeding between periods (Keeler et al 2020). Chronic period-like pain may occur days before menstruation in the pelvic area and/or without menstruation in regions beyond the pelvis (Agarwal et al 2019, Zondervan et al 2020).

Endometrial pelvic pain can be due to inflammation but can also be neuropathic. The mechanisms of neuropathic pain in endometriosis are poorly understood. The chemokine fractalkine (CX,CR1) is known to play a role in neuropathic pain generally, and a preliminary animal study concluded that the fractalkine/CX,CR1 signalling pathway may be one of the mechanisms of peripheral hyperalgesia in endometriosis (Liu et al 2018). Neuropathic pain may persist after an endometrial lesion has been surgically removed and may lead to chronic pain that is resistant to non-steroidal anti-inflammatory drugs (NSAIDs) (As-Sanie et al 2016, National Institute for Health and Care Excellence (NICE) 2017, Agarwal et al 2019).

Other symptoms that patients may report include dyspareunia (pain during sexual intercourse), nausea, vomiting, diarrhoea, constipation, painful urination, pain with bowel movements and chronic fatigue (Keeler et al 2020, Zondervan et al 2020). In addition to deep pelvic pain, patients with endometriosis who present to the ED may report dysfunctional uterine bleeding, lower abdominal pain, abdominal distention and a history of infertility (Schaider et al 2020).

**Investigations**

The fact that endometriosis can easily be mistaken for more common conditions causing pelvic pain in women, the high

Laparoscopy and histology would not be undertaken in the ED, but ED nurses can assist in identifying women who are likely to have endometriosis by considering it as a potential differential diagnosis. Careful and thorough history taking and physical examination may reveal risk factors for endometriosis and signs and symptoms indicative of it. In particular, premature menarche and/or irregular, heavy periods lasting more than five to six days are typical findings in women with endometriosis (Treloar et al 2010, Agarwal et al 2019). A general physical examination may not reveal any abnormalities, but a pelvic examination may reveal a retroverted uterus, uterine masses, decreased mobility or stiffness, nodularity and/or tenderness (NICE 2017, Agarwal et al 2019).

In addition to history taking and physical examination, investigations such as ultrasound and magnetic resonance imaging (MRI) can support the diagnosis of endometriosis by enabling healthcare professionals to visualise deep lesions. Transvaginal ultrasound and MRI have a sensitivity and specificity greater than 90% for diagnosing deep endometrial lesions in the rectum and rectovaginal septum (Nisenblat et al 2016, Zondervan et al 2020, Woo and Long 2021). However, these imaging modalities do not enable the visualisation of superficial lesions, which can only be diagnosed through laparoscopy (Zondervan et al 2020). Also, they may not be feasible in the ED because of time constraints and lack of availability, and may have to be performed in an outpatient setting.

**Treatment**

In the ED, female patients with suspected endometriosis need to receive appropriate treatment. Even in the absence of a definitive diagnosis, the role of ED nurses includes initiating first-line treatment involving the administration of oral or parenteral NSAIDs to control pain. Although a Cochrane systematic review of the use of NSAIDs for managing pain in women with endometriosis showed that they have limited effectiveness (Brown et al 2017), an initial three-month trial of NSAIDs is nonetheless recommended because of their effectiveness in treating dysmenorrhoea, their favourable short-term side effect profile, their high acceptability and their low overall cost (NICE 2017). A three-month trial of NSAIDs initiated in the ED will be followed up in primary care. Severe acute pain can be treated with NSAIDs administered intramuscularly or intravenously, such as ketorolac trometamol or morphine (Schaider et al 2020). It is important to remember that the short-term use of NSAIDs is considered safe but their long-term use can lead to gastric bleeding, increased cardiovascular risk and renal dysfunction (Chang et al 2020). In addition to NSAIDs, the first-line treatment in women with suspected endometriosis and pelvic pain also involves the use of oral combined or progestin-only contraceptives, for which the patient will need to be referred to their GP (Harada et al 2017, Zondervan et al 2020).

For women with severe symptoms of endometriosis that are not alleviated by NSAIDs, a possible second-line treatment option is a trial of gonadotropin-releasing hormone (GnRH) analogues (Bedaiwy et al 2017). The repeated and continuous administration of these medicines decreases the secretion of GnRH. Decreased levels of GnRH mean decreased secretion of luteinising hormone and follicle-stimulating hormone, which in turn reduces ovulation (Bedaiwy et al 2017).

Patients whose symptoms persist despite first-line and second-line pharmacological treatment should be referred to a gynaecologist or endometriosis specialist for further assessment and treatment options. These include the surgical removal of endometrial lesions and nerve transection to decrease pain.
and improve quality of life (Dunselman et al 2014, Brown and Farquhar 2015, NICE 2017, McCormick et al 2021). Studies investigating the administration of the hormone progesterone to reduce endometrial lesions have shown some success, but only in reducing superficial lesions (Reis et al 2020).

**Conclusion**

Endometriosis, which affects approximately 10% of women of reproductive age, is challenging to diagnose because of the high variability and non-specificity of signs and symptoms, the absence of biomarkers and the fact that laparoscopy is needed to establish a definitive diagnosis. Endometriosis is often mistaken for many more common conditions causing pelvic pain in women, which results in delayed diagnosis and management. If women of reproductive age present to the ED with severe pelvic pain, nurses need to consider endometriosis as a potential differential diagnosis, conduct history-taking and examination, request investigations and initiate first-line treatment and/or refer patients as appropriate.

**References**


