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Managing Dysmenorrhoea and Chronic Pelvic Pain in Adolescence: A Guide for Clinicians

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1. Abstract

Chronic pelvic pain and dysmenorrhoea are not so rare in adolescence. It is important to assess clinically young girls with these symptoms to exclude gynaecological conditions like endometriosis, pelvic inflammatory disease, ovarian cysts, and obstruction of the reproductive tract or non-gynaecological causes, like irritable bowel syndrome, interstitial cystitis, and myofascial pain. Management of chronic pelvic pain in this group of population can be more complex, because of the involvement of parents, the fact that clinicians must consider the long term emotional and physical health, fertility or sexuality of young girls. Psychological support can also be employed if indicated. This review is aiming to present the man causative factors of chronic pelvic pain and dysmenorrhoea, the evaluation, and its treatment in adolescence. Management plans and treatment options will be presented in a cause-specific approach.

2. Introduction

Chronic pelvic pain [CPP] is a non-specific intermittent or continuous pain in the lower abdomen, pelvis or intrapelvic structures, lasting over 6 months and affecting mainly women of reproductive age. The definition does not differentiate between adults and adolescents; however, management approach should be targeted on common causes reflective of patient's age [1]. More specifically, although adolescents may complain of dysmenorrhea, cyclical pain associated with menstrual cycle, they may experience CPP without cyclical characteristics, regardless of their menstruation. In the majority of cases, the underline causes for CPP in adults and adolescents are similar, apart from the obstructive reproductive tract anomalies, which are almost exclusively diagnosed in adolescence, by failing to reach menarche.

Due to patient's age and evolving physical and emotional puberty, clinicians ought to be cautious and adopt a patient's individualized approach in history taking, physical examination, evaluation, and proposed treatment plan the respects patient's wishes. Management of chronic pelvic pain in adolescents is often more complex than in adult women due to the long-term implications, fertility issues, and even future sexuality that need to be addressed. Prevalence of CPP in adolescents remains poorly reported, while in adults it is estimated approximately at 15% in general population [2,3]. Dysmenorrhea, as a type of CPP in patients of this age group, shows a variable prevalence, estimated at 30% up to 90% of presenting cases. Undoubtedly, this trend reflects a degree of subjectivity in this condition, although severe dysmenorrhea interfering with daily activities is less common and reported to affect up to 9% of adolescents [4]. In addition, variable definitions regarding CPP, inability to accurately estimate severity, as well as some geographical and cultural differences ought to be considered when managing these patients. Although in the past, we used to believe that dysmenorrhea manifests mainly in ovulating adolescents, recent studies have shown that painful menstruation is related to an ovulatory cycle [5]. Adolescents with severe dysmenorrhea were found to have increased risk for depression and anxiety compared with general population, emphasizing the spectrum of symptoms associated with CPP [6,7]. Chronic pelvic pain in adolescents may be attributed to both, gynaecologic and non-gynaecologic condi-

tions. All sensible causes need to be eliminated in order to provide the optimal management for these cases.

In this narrative review, we are focusing on Chronic Pelvic Pain and its management in adolescence. Management plans and treatment options will be presented in a cause-specific approach.

3. Gynaecologic Conditions Presenting with Cpp

The main gynaecologic conditions that can cause chronic pelvic pain and/or dysmenorrhea in adolescents are endometriosis, obstruction of the reproductive tract, pelvic cysts or masses, and pelvic inflammatory disease [PID].

Obstructive reproductive tract anomalies are usually diagnosed at a young age presenting with primary amenorrhea in an otherwise fully developed pubertal girl accompanied by cyclical or non-cyclical pelvic pain. The chronicity of a background pelvic pain in these cases is a stable variable, however periods of symptom outburst that lead patients to the emergency department are well reported. The painful event of acute onset can be associated with urinary retention, low back pain, or constipation caused by accumulation of menstrual blood in the vagina and/or in uterus [8]. In cases of imperforate hymen, the diagnosis is set by inspection of the external genitalia and identification of the bulging bluish hymenal membrane. With regards to transverse vaginal septum, there is a normal-appearing hymenal ring without a bulging membrane and in the same time, after a gentle introduction of a Q tip in the vagina obstruction at the level of the septum is expected. Once large hematocolpus is recognised by ultrasound, septum should be suspected, but further imaging, like magnetic resonance imaging [MRI] is necessary to identify the level and the length of the obstruction, and to differentiate this anomaly from vaginal agenesis. When there is only partial obstruction of reproductive tract, diagnosis or treatment can be delayed. In those cases, young girls are presented with dysmenorrhea or prolonged pelvic pain. Hematometra or hematocolpus are the main findings during sonographic assessment [9]. These uncommon anomalies include the OHVIRA syndrome [uterus didelphys with obstructed hemivagina and ipsilateral renal agenesis], where a one side of a didelphys uterus is blocked by an oblique vaginal septum, and a bicornuate or unicornuate uterus with an obstructed no communicating horn.

Inflections within the genital organs in girls and women is an important problem in gynaecology. It is necessary to recognise the cause and mechanisms that help to avoid recurrence. Young patients report many and different symptoms and clinical diagnostics can be really challenging. In girls before menarche, 75% of gynaecological illnesses result from vulvovaginitis, which is associated with age, systemic diseases, or sexual abuse. Vaginal mucosa is relatively fragile and can easily get damaged [10]. Fungal infection is very common [about 0.5–1.5% of cases] and the main contributing factors are diabetes type 1 for young girls, long-term antibiotic therapy, immunosuppression, congenital immunodeficiencies, allergic rhinitis, allergic diseases, a diet rich in simple sugars [10]. Clinical picture is similar with similar cases in adulthood and involves persisting itching, redness, oedema, or oozing.

In recent years, an extensive research interest regarding endometriosis in adolescence has been clearly expressed. It is plausible that endometriosis may present at any stage of life in hormonally active females. Endometriosis seems to be a common cause of dysmenorrhea and chronic pelvic pain in adolescents. Janssen et al. showed that among adolescents who underwent laparoscopy for the investigation of pelvic pain, endometriosis was found in 60% of all cases and in 75% of adolescents whose pain was unresponsive to medical treatment [11]. As expected, this study may have overestimated the prevalence of endometriosis in adolescents presenting with CPP, since most studies, included in the meta-analysis, were performed in tertiary centres likely to treat more severe cases. The main symptoms of endometriosis at that age are dysmenorrhea, non-cyclical pain, pain associated with bowel movement and urination or dyspareunia in sexually active teens [12]. Surprisingly, recent research revealed that in 30 to 40% of cases of endometriosis occurring in adolescence are classified as severe [13]. Surgically diagnosed endometriotic lesions in adolescents are often described as clear, red, white, and/or yellow-brown, as opposed to café au lait lesions that are more common in adults suffering from this disease [14].

Adnexal cysts are common in this group of population [15]. Functional ovarian cysts are more common in young girls with menstrual cycle and are accompanied with acute pelvic pain during ovulation [Mittelschmertz] or the luteal phase of cycle. However, they can be present in cases of non-regular menstrual cycle, during a non-ovulatory cycle. Non-functional adnexal cysts can be endometriomas, benign ovarian cysts like cystic teratoma and benign serous or mucinous cystadenoma. Some rare cases of ovarian borderline or malignant tumours [germ cell, granulosa cell, or epithelial tumours] can also be present. Cysts can be asymptomatic, however larger cysts can present with chronic pelvic pain and pressure symptoms affecting the bladder or the bowel. The association between cyst size and pelvic pain is not well defined, but it appears that cysts with a diameter of less than 4 cm are rarely symptomatic. In case of ovarian torsion, patients are presented with acute onset pelvic or abdominal pain, often associated with nausea or vomiting. If left untreated, patient's painful symptom subsides once necrosis has been established which could jeopardize prompt management in these cases. Similar to adult women, transvaginal ultrasound is the first line imaging investigation with high sensitivity and specificity, however this option is not feasible in not sexually active teenagers. On pelvic ultrasound, the different characteristics of benign and malignant adnexal cysts can be assessed by the grey scale or colour Doppler [16]. Depending on this evaluation, conservative management and surveillance may be offered to adolescents with functional appearing cysts, while further investigation and surgery is considered in cases of symp-

tomatic non–functional appearing cysts, especially those with features suggestive of malignancy [17].

Chronic pelvic pain is a common long-term sequence of pelvic inflammatory disease [PID] in adolescents. There is an increased risk of PID in this group of population in association with sexual behaviour that young patients may exhibit, such as multiple partners or less frequent use of condoms [18]. The PEACH trial [PID Evaluation and Clinical Health] reported that 30% of adolescents diagnosed and treated for PID developed chronic pelvic pain. This percentage increased to 68% in those with recurrent episodes of PID and to 52% in those with recurrent lower genital tract infection [19].

4. Non-Gynaecologic Conditions

The non-gynaecologic differential diagnosis of chronic pelvic pain in adolescents includes gastrointestinal, urological, and musculoskeletal conditions, as experienced also in older women. Irritable bowel syndrome [IBS] is characterized by recurrent episodes of abdominal and pelvic pain that are typically associated with bowel movements, as well as altered bowel movements in the form of constipation, diarrhoea, or alternating constipation and diarrhoea. Rome system is based on criteria associated with symptoms and has been developed to avoid unnecessary testing [20]. Symptoms' severity and disease exacerbations are often associated with psychosocial stress and mood disorders. According to the latest update on these criteria, Rome IV, irritable bowel syndrome is diagnosed in a patient reporting recurrent abdominal pain present at least 1 day per week in the last 3 months in association with defecation, a change in frequency of stool, or a change in the appearance of stool. Symptoms like weight loss, unexplained fever, rectal bleeding, severe vomiting or diarrhoea, joint pain, and a family history of inflammatory bowel disease are not typical of irritable bowel syndrome. In these cases, physicians should focus on organic gastro- intestinal disorders including celiac disease and inflammatory bowel disease [21]. However, clinicians ought to remember that the diagnosis of IBS should be set after excluding common gynaecologic and non-gynaecologic conditions that are associated with CPP and dysmenorrhoea.

Another cause of low abdominal pain is interstitial cystitis, that is also called painful bladder syndrome [22]. Pain is mainly associated with urinary symptoms such as urinary frequency, urgency, dysuria, and nocturia. Studies are relatively few on its prevalence among adolescents. Rackow et al. conducted a study with 28 adolescents and young women with chronic pelvic pain that underwent laparoscopy and occasionally cystoscopy [22]. Almost 40% of patients were found to have interstitial cystitis. In 25% of these cases, patients had in the same time endometriosis and interstitial cystitis, which is also common in adult population too. Young women with persistent urinary symptoms and a negative urine culture should also be tested for sexually transmitted infections. Prentiss et al. reported that 9% [21 of 233 teenagers] of adolescents presenting with urinary symptoms were diagnosed with sexually transmitted infection [23].

The musculoskeletal system may be the primary cause of chronic pelvic pain, or secondarily involved as a response to another painful stimulus. Components of the musculoskeletal system which can cause or contribute to pelvic pain include the abdominal wall muscles, the abdominal wall fascia, the pelvic and hip muscles, the sacroiliac joints, and the lumbosacral muscles. Few studies have evaluated the musculoskeletal component in teens with chronic pelvic pain. Schroeder et al evaluated 63 teens with a diagnosis of chronic pelvic pain. Of those, up to 80% had signs of musculoskeletal involvement on physical exam [24]. In addition, 10% of teens were found to have trigger points, defined as hypersensitive areas on abdominal palpation. Patients who were diagnosed with myofascial-type pain were referred to physical therapy. Symptom resolution was reported by 95% of patients who completed the physical therapy.

Pelvic or abdominal adhesions can also be the cause of chronic pelvic pain and/or dysmenorrhoea in adults and children. More specifically in adults, 70% of patients with chronic pelvic pain recognise an improvement of symptoms after laparoscopic adhesiolysis, the long-term efficacy of adhesiolysis though remains unknown [25]. As expected, adolescents usually have an unremarkable surgical history, as a result it is unusual to find adhesions, especially in the absence of endometriosis or PID. Very rarely, adhesions are present in cases where adolescents had abdominal surgeries or ruptured appendicitis and peritonitis as children. In those cases, pelvic adhesive disease is possibly a contributing factor to the presence of CPP. It is important though to take into consideration the risk for surgical complications [such as bowel injury and fertility implications], before embarking on surgical exploration at such young age.

5. Evaluation

5.1. History

It is crucial to evaluate appropriately the medical and surgical history of a patient presenting with CPP and/or dysmenorrhoea in adolescence. In addition, pelvic pain's characteristics [the pain's location, character, intensity, and radiation] and its interference with daily life activities provide essential information and direct the future management for these patients. It is also important to try address any relieving factors including rest, lying down etc. as well as, other factors that can cause exacerbation of symptoms. If pain is involved with everyday activity can be assessed by asking about school absence and academic performance, participation on social or sports activities. In addition, it is necessary to evaluate signs of cyclical [ie dysmenorrhoea] and non-cyclical pain pattern, that will direct the overall management approach.

The gastrointestinal and urinary symptoms should be explored and addressed as discussed earlier. Pain with bowel movements, rectal bleeding, or haematuria are assessed, and may be associated

with deep infiltrating endometriosis or with inflammatory bowel disease or other gastrointestinal conditions. The overall pubertal development and characteristics of menstruation [regularity, duration, and flow] should be discussed in depth. Previous treatments for pelvic pain [medical, surgical, and alternative medicine] and their outcomes are useful in addition to obtain information regarding family history in order to determine possible risk factors that might explain the symptomatology [26]. Once the clinician has established a good relationship with a patient, a confidential discussion should follow, where she is asked about her sexual activity, number of sexual partners, risk for sexually transmitted disease, dyspareunia, smoking and recreational drug use, past or present exposure to abuse, and overall psychologic components associated with the complaining symptoms. This discussion is obviously modified according to patient's age and perception, and it might require more than one visits. Subsequently, parents should also be offered the possibility of a confidential discussion with the physician.

5.2. Physical Examination

Common physical examination with observation and palpation is important for all patients to exclude the presence of profound abdominal masses, hernias etc. When pain is increased after flexion, followed by contraction of abdominal wall, the symptom is most likely due to myofascial cause. All sexually active young women can have pelvic examination, where a small speculum can be used and gather information for cervical or vaginal mucosa by direct observation. When is necessary and possible, bimanual examination will complete the pelvic examination. This will assess the uterus for its size, mobility, flexion or adnexal tenderness or presence of pelvic masses. When vaginal examination is not possible, rectal examination can be performed, where pelvic masses or even uterosacral nodules of endometriosis can be assessed.

5.3. Imaging and Laboratory Tests

Imaging modalities along with initial blood tests may facilitate accurate diagnosis. Primary imaging test is transabdominal or transvaginal ultrasound, although sexual activity should have been commenced in order to employ the latter sonographic modality. Ultrasound is aiming to recognise the pelvic female anatomy, any obstruction that may cause hematometra, haematocolpos or any other pathological findings. Most of the cases presenting with obstruction will be further investigated with MRI, where urinary tract anomalies will be assessed too, as their common embryologic origin suggests [27].

When endometriosis is suspected, ultrasound needs to be performed by specialised trained sonographer or gynaecologist, who can identify accurately, lesions of deep infiltrative endometriosis in the uterosacral ligaments, rectovaginal septum, rectosigmoid, vagina, and bladder [27].In patients with endometriosis, MRI has also high diagnostic accuracy and can be employed as an alternative imaging modality in patients who are sexually inactive[28]. Regarding laboratory tests, pregnancy test, testing for sexually transmitted infections and urine analysis are important as first line. Any other blood marker can be included driven by medical indication, possible diagnosis, and overall findings. In most cases inflammatory markers like WBC and CRP can be arranged in case of symptoms of PID or infection at vagina or vulva. Swabs can also be taken without disturbing the hymen of these young girls.

5.4. Management

While planning medical or surgical management, healthcare providers should always ensure confidentiality [i.e., regarding her sexual activity]. Parents are often concerned that the use of hormonal medications such as combined oral contraceptive pills [COC] for their non-contraceptive benefits may negatively impact their child's sexual health and behaviour. Parental concerns regarding fertility and risk of cancer when choosing medical management should be addressed by the physician in the first instance [29]. The management of endometriosis in adolescents is similar to that in adults but with emphasis on optimizing their long-term health, reproductive and sexual function, as it has been well established that endometriosis is a progressive disease. In the absence of endometriomas or signs of deep infiltrating endometriosis on examination or on imaging, empirical medical treatment with first-line hormonal suppression is appropriate as the initial management option. Combined oral contraception pills [COCP] are often helpful in alleviating both dysmenorrhea and non-cyclical pelvic pain [30]. A cyclic or a continuous regimen may be used. Vercellini et al. showed that dysmenorrhoea in adult women is improved by 70% when a cyclic COCP is swapped to a continuous COC, and a similar benefit may be expected in adolescents [31]. The main disadvantages of the continuous administration are spotting and breakthrough bleeding, reported in a third of patients [31]. A meta-analysis concluded that COCPs do not increase the risk of obesity and do not affect growth and stature of adolescents [30]. Nevertheless, COCs may have a negative impact on bone mass density acquisition in adolescents, although the long- term implications of this pharmacological agent remain unknown [32]. Teens may also be prescribed combined estrogen–progestin via transdermal route, with presumed similar benefits and risks, including the risk for venous thromboembolic events which are estimated to be in the range of 4/10,000 women for otherwise healthy young women using low-dose COCPs [33].

Alternatively, various progesterone preparations may be empirically prescribed. Eber et al. studied the effect of Dienogest in adolescents between 12 to 18 years with clinically suspected endometriosis [34]. These young women received treatment for 52 weeks. As a result, pain was improved, but there was a decrease in lumbar bone density, which recovered partially within 6 months after completing treatment. Other oral progesterone preparations, such as norethisterone acetate, appear to have a similar benefit in alleviating dysmenorrhea in adolescents [35]. Intrauterine progesterone

treatment with the levonorgestrel-containing intrauterine device does not require day-to-day compliance, but its insertion may be associated with significant discomfort even in sexually active teens [36]. Thus, the optimal timing for the levonorgestrel-containing intrauterine device may be at the time of laparoscopy. Symptoms' improvement with empirical hormonal therapy does not confirm or rule out the diagnosis of endometriosis. Indeed, laparoscopy remains the gold standard for the endometriosis diagnosis in teens and adults. Laparoscopy is offered to teens with suspected endometriosis whose pain is unresponsive to first-line hormonal medical treatment, or whose disease appears to be advanced. Minimal or mild stage endometriosis [with typical appearance of clear, red, or white peritoneal lesions in adolescents] is surgically managed by excision or ablation, with 80% of teens reporting significant improvement in their pain after surgery [14,37]. However, because pain recurrence is common, postoperative hormonal suppression is recommended to decrease risk of recurrent pain and avoid reoperation, performed in up to 35% of teens [38]. Endometrioma in adolescents can be managed surgically by cystectomy or by drainage and cyst ablation. The former procedure is associated with a lower recurrence rate, but also with higher risk of ovarian damage and decreased ovarian reserve, which may reduce future fertility [39] In adults, haemostasis with bipolar energy is also associated with decreased ovarian reserve, as opposed to the use of sutures or haemostatic agents [39]. That is why these patients should be treated by experienced surgeons but also not to forget the use of hormonal adjuvant therapy in addition to the operation. At the same time patients of this group should consult a fertility specialist, to discuss options of fertility preservation and to assess ovarian reserve [40].

Gonadotropin-releasing hormone agonists can be a potential treatment for teenagers that even have surgically confirmed endometriosis and their pain is not manageable with other medical treatments. The duration is between six to twelve months because of the risk of bone density loss. The "add back" combined oral contraceptive pill, with progesterone and oestrogen is recommended, to prevent or reduce the risk of side effects [41].

Reproductive outflow tract obstructive anomalies are managed surgically. When young women are presented with haematocolpos, surgical excision of hymenal membrane is recommended. These conditions in general require the involvement of experts on the field [8]. Uterine anomalies or obstructive vaginal anomalies are not conditions that require an urgent management, when is necessary though their management demands an experienced clinician, mainly because of the high risk of stenosis following a transverse vaginal septum, distal vaginal atresia, and cervical atresia. Simple incision and drainage of hematocolpos should not be performed since it is associated with a high rate of ascending infection and sepsis and may complicate definitive surgery. Operation should be expedited in case of urinary retention, severe pain or infection. When retention is present an indwelling catheter will resolve the symptom, although temporarily. When acute pyometrocolpos is diagnosed, young girls should be hospitalized for intravenous broad spectrum antibiotics and surgery should be expedited [42].

It should be mentioned that menses need to be immediately suppressed, with oral medroxyprogesterone acetate, 20 mg by mouth three times per day [8]. In some cases, operation must be delayed, since young girls are not committed to vaginal dilatation. Menstrual suppression allows adequate time for an adolescent to mature, understand the diagnosis and dilation process, and actively participate in shared decision making, therefore menstrual suppression is necessary. Ovarian cysts with a simple cyst appearance on ultrasound or with the sonographic characteristics of functional findings [i.e., corpus luteum cysts] may be managed expectantly in the absence of adnexal torsion signs. Teens with persistent ovarian cysts, cysts with non-simple sonographic characteristics, and cysts causing pelvic pain are referred for surgical cyst excision, preferably by laparoscopy. Unless malignancy is suspected, laparoscopic cystectomy with ovarian preservation is the appropriate method in these young patients.

Irritable bowel syndrome is managed by a combination of dietary interventions, lifestyle modifications [such as fibre supplements and lactose-free diet], probiotics, possibly medications [such as antispasmodics and antidiarrheals], and psychological therapy [such as Cognitive behavioural therapy-CBT] [21]. Interstitial cystitis can be managed with a specific diet, like avoiding caffeine or fibres and bladder training too. When symptoms are more severe, medical treatment and pelvic floor physiotherapy can also be employed. The majority of young patients will require bladder hydro-distension, instillations and medications including neuropathic medications or antihistamines [43]. In cases of myo-fascial pain, physiotherapy is important in addition to local anaesthetics and /or corticosteroids. These patients can also have improvement of their symptoms with hormonal treatment, to supress these changes during their menstrual cycle, since it can be associated with hormonal fluctuations.

Psychosocial counselling plays in important role in the management of teens with dysmenorrhea and chronic pelvic pain, which are at increased risk for developing depression and anxiety [44]. On one hand, chronic pelvic pain may lead to or exacerbate underlying depression and anxiety. On the other hand, the perception of pain may be increased in teens with depression and anxiety, and they are at risk for developing maladaptive pain coping strategies such as social withdrawal during their symptomatology peak [45]. Psychosocial counselling is well established for its therapeutic effects and may also identify teens who could benefit from antidepressant therapy. In addition, various cognitive behavioural therapies may provide patients with strategies for positive pain coping. Additional strategies for stress management and improved quality of life such as art, yoga, and alternative medicine are tailored according to the teen's preferences [46].

6. Conclusion

The prevalence of dysmenorrhea among young women is consistently high. These young girls very often may miss school, university or they can have impaired their academic performance. At the same time, they can develop anxiety or even depression. Many different conditions can be the reason of symptoms at this group of population, like endometriosis, obstructive reproductive tract anomalies, adnexal cysts, and other non-gynaecological conditions.

Future research should focus on strategies to improve pain and symptom management with the aim of reducing the impact of dysmenorrhea so that young women can optimize their educational opportunities and future life chances.

7. Conflict of Interest

All authors declare no conflict of interest.

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