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Review Article

Etiology, staging, and management of cystocele

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ABSTRACT

A cystocele is usually found to protrude the urinary bladder through the vaginal wall. Various causes have been reported in the literature for the pathogenesis and development of cystocele. These can cumulatively lead to a remarkable weakness in the muscular and connective tissue layers related to the urinary bladder and anterior vaginal wall. The present study discusses the etiology, staging, and management of patients with cystocele. Evidence indicates that a defect within the pelvic-floor supporting system can significantly lead to the development of cystocele. Parity, increasing age, and obesity are the main associated risk factors for developing these events. Staging is important to decide the most suitable treatment plan, which might be conservative or surgical. Some patients do not require any management approach, being asymptomatic, and refuse the current treatment modalities. Surgery has been associated with enhanced outcomes and can be conducted via two different approaches, including anterior colporrhaphy and sacral colpopexy.

Keywords: Cystocele, Vaginal prolapse, Staging, Management, Causes, Etiology, Risk factors

INTRODUCTION

Pelvic visceral in women is supported by endopelvic fascia and pelvic floor muscles.[1] Moreover, three muscles form the pelvic support group, including iliococcygeus, puborectalis, and pubococcygeus, which cumulatively form the levator ani muscle group. Additional stabilization and support are also provided by uterosacral and cardinal ligaments. A cystocele is usually found to protrude the urinary bladder through the vaginal wall. The anterior vaginal wall is the most commonly affected, and the bulging bladder is anatomically correlated.[2]

Various causes have been reported in the literature for the pathogenesis and development of cystocele. These can cumulatively lead to a remarkable weakness in the muscular and connective tissue layers related to the

urinary bladder and anterior vaginal wall. The quality of life of the affected patients can be significantly impaired secondary to dysfunction in the routine sexual and physical activities of affected patients.[3] The severity of the condition is remarkably variable as some patients might have asymptomatic disorder while others might have prolapse regression after menopause.[4] The management of these conditions usually varies based on the stage and severity of the condition. Accordingly, we aimed to conduct this literature review to discuss the causes, staging, and management of cystocele based on the reported outcomes of previous studies.

LITERATURE REVIEW

This literature review is based on an extensive literature search in Medline, Cochrane, and EMBASE databases which was performed on 27th December 2021 using the medical subject headings (MeSH) or a combination of all possible related terms, according to the database. To avoid missing potential studies, a further manual search for papers was done through Google Scholar while the reference lists of the initially included papers. Papers discussing etiology, staging, and management of cystocele were screened for useful information. No limitations were posed on date, language, age of participants, or publication type.

DISCUSSION

Etiology and risk factors

Many causes and risk factors have been proposed for the incidence and development of cystocele. These will be discussed in the current section. Evidence indicates that a defect within the pelvic-floor supporting system can significantly lead to the development of cystocele. Parity, increasing age, and obesity are the main associated risk factors for developing these events. Many etiologies were also reported for the development of these events. These include having a history of pelvic surgery, a family history of cystocele, a chronic collagen abnormality, and increased intra-abdominal pressure. These factors will be discussed subsequently in the following paragraphs.

Increased risk of pelvic floor weakness is usually associated with vaginal delivery. In this context, evidence indicates that parity is usually associated with a significant attenuation of pelvic floor muscles.[5] Accordingly, a previous investigation by Nygaard et al estimated that the risk of pelvic floor disorders is significantly increased by 32.4%, 24.6%, 18.4%, and 12.8% among females with three, two, one, and zero deliveries, respectively.[6] Besides, a previous study reported that the risk of avulsion of levator ani muscle might be significantly increased with forceps delivery.[7] Another study by Mant et al showed that vaginal prolapse might be remarkably associated with the first stage of labor, indicating the strong association between pelvic prolapse and cystocele and parity.[8] Evidence from previous multiple studies also indicates that vaginal prolapse can be significantly associated with the aging of the population, making them at high risk of developing the condition.[9,10] Furthermore, a previous study reported that reduced strength of the pelvic floor muscles is remarkably associated with aging secondary to associated changes in vasculature, innervation, and pelvic anatomy.[11] Another study also concluded that there might be an association with aging and the development of pelvic prolapse and cystocele secondary to a biopsy from the vaginal tissues. The biopsy showed that the collagen structure within these tissues significantly changes over time.[12]

Obesity also plays a major role in developing pelvic prolapse and cystocele. In a previous systematic review, Giri et al showed that the risk ratio for developing vaginal prolapse was 1.47 and 1.36 for women with a body mass index of >30 and >25, respectively.[13] Another comparative investigation also showed that the risk of developing a cystocele significantly increased among overweight and obese women by 32% and 48%.[14] These results were obtained when the authors compared these findings with women with normal body mass index. On the other hand, it should be noted that some studies aimed to assess whether weight reduction would affect the risk of developing cystocele. However, it has been reported that neither cystocele regression nor symptom resolution was associated with weight reduction. Some studies even indicated that worsened clinical manifestations were associated with weight loss, indicating that the underlying pathogenesis regarding damage to the pelvic muscle floor is irreversible.[14,15] Furthermore, evidence indicates that obesity might also lead to increased intra-abdominal pressure, significantly increasing the pathogenesis of developing pelvic prolapse, anterior vaginal prolapse, and cystocele. In this context, many previous studies in the literature indicated a significant correlation between different factors that lead to increased intra-abdominal pressure, as obstructive pulmonary diseases, chronic cough, and constipation, and the development of cystocele in women. Accordingly, further insight should be given to these disorders to possibly intervene against them and reduce the risk of developing cystocele and other pelvic prolapse conditions.[16-18]

Family history might be involved in the pathogenesis and development of pelvic prolapse and cystocele. There is no apparent association between the development of vaginal prolapse and the presence of a certain gene. However, a previous review demonstrated that having relative suffering from pelvic prolapse increases the risk of developing the condition, as concluded from the results of 16 included investigations in this review.[19] Collagen abnormality is also another risk factor. It is well-established that collagen type III is predominantly found in vaginal wall tissues. This type must be present in these tissues, which require elasticity. Accordingly, it has been shown that collagen type III is remarkably able to resist sudden changes frequently encountered in these areas. In

this context, a previous investigation found that the amount of collagen type III in vaginal wall tissues was significantly higher among patients with pelvic prolapse than normal women, indicating the significant association between these two events. This might be due to the increased frequency of remodeling among these tissues.[12] It has been furtherly shown that the development of cystocele might be significantly associated with having certain congenital disorders (like Ehlers-Danlos syndrome and Marfan syndrome) that might impact collagen synthesis and production.[20,21] Accordingly, estimates show that pelvic prolapse and cystocele are reported among three-quarters and a third of patients with Ehlers-Danlos syndrome and Marfan syndrome, respectively.[20] Having a history of pelvic surgeries might also represent a significant risk factor for developing cystocele. This might be attributed to the induction of significant damage to the underlying endopelvic nerves and facia. Accordingly, a previous report showed that the risk of bladder herniation and pelvic prolapse are significantly increased during these events.[22]

Staging

The pelvic organ prolapse quantitation (POPQ) system is usually used to classify patients with pelvic organ prolapse and cystocele. It was first reported in 1996 by the American college of obstetricians and gynecologists and had four stages. Stage 0 refers to no prolapse, and stage 1 means prolapse is above the level of the hymen (most distal part of prolapse is -1 cm), stage 2 means the prolapse is 1cm below or above the hymenal plane (most distal part of prolapse is $\geq$ -1 and $\leq$ 1). Stage 3 means that the prolapse protrudes < 2 cm than the total vaginal length and beyond the hymen (most distal part of the prolapse is > 1 cm but < total vaginal length by -2 cm. On the other hand, stage 4 means that the prolapse is $\geq$ total vaginal length -2 cm (with complete eversion of the vagina). If the uterus is present, four stages are used for classification.[23] In contrast, if the uterus is removed, three stages are used.[24] Another classification system was reported in the literature, which is the Baden-Walker halfway scoring system. However, it should be noted that this system is not recommended in clinical settings because it is not as precise as the POPQ system. This system is composed of the following stages. Stage 0 means a normal position for each respective site, and stage 1 means descent halfway to the hymen. On the other hand, stages 3 and 4 refer to descent to the hymen and descent halfway beyond the hymen, respectively.[25]

Management

After adequate staging and evaluation of the affected patients, deciding whether to treat the affected patients is significantly dependant on the stage. For instance, it has been suggested that women with asymptomatic cystocele and pelvic prolapse should not be treated.[26] Besides, evidence indicates that regression might occur in cases with stage 1 prolapse.[27] Therefore, applying treatment modalities should be for patients presenting with symptoms only. Conservative, expectant, and surgical approaches have been proposed in the literature as efficacious management modalities of the condition. Evidence indicates that the best outcomes are usually observed following surgical management.[28] However, all treatment options should be discussed with the patients to decide the most suitable treatment approach and subsequent potential outcomes and adverse events. Choosing the most appropriate treatment plan for cystocele depends on several factors. These include the presence of incontinence symptoms, associated posterior wall or uterine prolapse, extent, and nature of symptoms, future reproductive plans of patients, sexual and physical activities, and patient's age. Previous management outcomes and surgeons' experience are also other factors that should be considered.

In patients with asymptomatic conditions and mild symptoms of cystocele, it has been recommended that a watch and wait approach be considered in these events. Moreover, some patients might refuse available treatment options. Therefore, before conducting treatment plans, it is essential to have a thorough look over the patient to exclude other associated conditions and potential complications. Pelvic muscle exercises and vaginal pessaries are the commonest conservative approaches for managing cystocele. The main advantage of conducting these approaches is that they do not risk developing complications like the surgical approaches, making them suitable for patients at high risk of developing such complications. In addition, evidence indicates the favorable efficacy of these modalities with enhanced outcomes.[29,30] On the other hand, it should be noted that hormonal therapy for these patients is not recommended because of its little value in these situations. Moreover, it has been reported that estrogen administration might have potential benefits. However, it should not be used as definitive therapy, and other treatment approaches are encouraged.[31,32] Furthermore, studies recommend that managing risk factors is also important to reduce the risk of developing the condition and facilitate the recovery process.

Surgical management was also described in the literature as a valuable approach, especially for symptomatic patients when conservative treatment fails to achieve adequate outcomes and in cases when the patient requires urgent outcomes. Two main surgical approaches were widely reported in the literature with enhanced outcomes. These include anterior colporrhaphy and sacral colpopexy. A previous randomized controlled trial by Guerette et al reported that the success rate of anterior colporrhaphy is up to 63-76.5% based on the used technique of the surgical approach.[33] On the other hand, another investigation reported that the success rate for conducting sacral colpopexy might be up to 60-89% for repairing cystocele.[34] Moreover, Maher et al conducted a randomized controlled trial.[35] They indicated that reduced chances of repeating the procedure and enhanced success

rates were higher among patients undergoing laparoscopic sacral colpopexy in cases of posterior and anterior vaginal prolapse events. Evidence indicates that using mesh for cystocele repair by surgical approaches is no longer conducted in various countries, including the United Kingdom and the United States, based on a lack of evidence for their potential benefits.[36]

CONCLUSION

Evidence indicates that a defect within the pelvic-floor supporting system can significantly lead to the development of cystocele. Parity, increasing age, and obesity are the main associated risk factors for developing these events. Staging is important to decide the most suitable treatment plan, which might be conservative or surgical. Some patients do not require any management approach, being asymptomatic, and refuse the current treatment modalities. Surgery has been associated with enhanced outcomes and can be conducted via two different approaches, including anterior colporrhaphy and sacral colpopexy.

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