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Review Article

### MANAGEMENT OF POPLITEAL CYST IN ADULTS

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#### Abstract:

**Introduction:** Popliteal synovial cysts (Baker's cysts) are commonly encountered in both adults and children. Mostly, popliteal cysts are asymptomatic and are detected incidentally. The usual presentation of popliteal cysts is a swelling in the popliteal fossa slightly medial and distal to the center crease in the back of the knee. It is caused by enlargement of bursa between gastrocnemius and semimembranosus muscles.

**The aim of work:** In this review, we will discuss the diagnosis and management of popliteal cysts in adult patients presenting to surgical consultation.

**Methodology:** We have reviewed the medical literature databases for relevant studies in the past two decades until April 2020. All relevant full article were reviewed and included.

**Conclusion:** Plain radiography and ultrasonography usually are the initial assessment modalities. Incidentally discovered cyst with no symptoms require no intervention. Arthrocentesis of the knee and intraarticular injection with glucocorticoids is the recommended initial step in management of symptomatic popliteal cysts in adult patient with or without calf involvement. Surgical excision may be need in few selective cases.

**Keywords:** Baker's cysts, popliteal cysts, popliteal swelling, and surgical diagnosis of popliteal swelling.

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**INTRODUCTION:**

Popliteal synovial cysts (Baker's cysts) are commonly encountered in both adults and children.<sup>1,2</sup> Mostly, popliteal cysts are asymptomatic and are detected incidentally. Adults between 35 to 70 years of age are typical.<sup>3</sup> The usual presentation of popliteal cysts is a swelling in the popliteal fossa slightly medial and distal to the center crease in the back of the knee. It is caused by enlargement of the bursa between gastrocnemius and semimembranosus muscles.<sup>4</sup> In adults, Baker's cyst are often secondary to knee disease or injury that may lead to communication with joint space; directing synovial fluid into the cyst. By contrast, popliteal cysts are usually a primary process in children with no communication with the joint space.

The prevalence of popliteal cysts varies according to the imaging technique and the age of the patient. Males and females are affected equally. In patient with suspected internal derangement or osteoarthritis (OA), the prevalence ranges from 5 to 40 percent and from 23 to 32 percent by magnetic resonance imaging (MRI) and arthrography respectively.<sup>4,5</sup> This increases with age.<sup>6</sup>

Risk factors for Baker's cysts include a history of trauma (33 percent) or a history of coexistent joint disease (67 percent).<sup>7</sup> The most common joint disease include osteoarthritis (OA), rheumatoid arthritis (RA), and meniscal tears.

Popliteal cysts could undergo several complications. They may enlarge, dissect, and/or rupture. These complications, in turn, may lead to compression of adjacent structures resulting in symptoms and signs that mimic venous thrombosis.<sup>8</sup> Other serious complication include pseudo thrombophlebitis, leg ischemia, nerve entrapment, and compartment syndromes.<sup>9,10</sup> In this review, we will discuss the diagnosis and management of popliteal cysts in adult patients presenting to surgical consultation.

**METHODS:**

We have reviewed the medical literature databases for relevant studies in the past two decades until April 2020. Medline database in the form of Medical Subject Headings (MeSH), PubMed database, and google scholar were the platforms on which a thorough search was conducted. All relevant full article was reviewed and included. The terms used in the search process include Baker's cysts, popliteal cysts, and surgical diagnosis of popliteal swelling.

**Diagnosis**

The diagnosis of popliteal cyst can be based on clinical examination alone. However, imaging studies may be needed in some patients in case of uncertain diagnosis or when another condition is suspected. The finding in clinical examination include the presence of medial popliteal mass that is most prominent with the patient standing and the knee fully extended. Knee flexion to 45 degrees softens or hide the cyst; the sign is known as Foucher's sign. This is explained by tension relieve on the cyst.<sup>11</sup>

Imaging studies are reserved for cases where the diagnosis is uncertain or other conditions are suspected. Difficulty differentiating a cystic from a solid mass, lack of significant change with range of motion, laterally located mass, and the absence of knee pathology warrant the use of imaging. Imaging is also needed if the clinical presentation suggests vascular or neurologic structure involvement. Plain radiography and ultrasonography usually are the initial assessment modalities. They are noninvasive and easily obtained, and they provide sufficient information. Plain radiographs may detect osteonecrosis or significant cartilage narrowing due to osteoarthritis. Limitations of a plain radiograph of the knee include limited ability for viewing the cyst itself, however, a soft tissue mass (the cyst) or a joint effusion may be seen, particularly on lateral views.<sup>1,2</sup>

Ultrasound can readily identify cysts, estimate their size and extent usually as fluid-filled spaces. Additional advantages of ultrasound include the absence of radiation risks and its increasing availability. Ultrasound can easily detect cysts that are as small as 1 to 2 centimeters.<sup>12</sup> Ultrasound can be used to differentiate popliteal (Baker's) cysts from popliteal aneurysms, ganglion cysts, or other popliteal masses. Baker's cysts appear as an anechoic mass on US and may include echogenic debris or septations.<sup>13</sup> Ultrasound can play a role in patients suspected to have thrombophlebitis or cyst-related "pseudo thrombophlebitis" syndrome as it is able to show venous circulation. In these cases, the findings on ultrasound correlate well with venography.<sup>14</sup> It may not be possible to distinguish cyst rupture from dissection, but either can usually be detected if present.<sup>8</sup> Infrequently, a complete cyst rupture may not be visualized by US and additional advanced imaging studies could be used.

Experts recommend the use of Knee MRI in case of suspicion of internal derangement and in case of possible surgical intervention. Examples include the need to differentiate a tumor from a popliteal cyst with debris. Magnetic resonance imaging provides high definition of the popliteal space, the cyst, and associated structures. Advantages of MRI that are not provided by US include its ability to detect intraarticular knee pathology, such as a meniscal or ligamentous injury. MRI shares similar safety level with US regarding the risk of ionizing radiation. The cysts appear on MRI as a high signal on T2-weighted, short T1 inversion recovery (STIR), and proton density sequences. Compared with US and plain radiograph, MRI provides better soft tissue details and multi-planar imaging capability. Thus, it is the technique of choice in patients who require further imaging studies following initial assessment.<sup>15</sup>

### MANAGEMENT

Incidentally discovered cyst with no symptoms require no intervention. The patient with asymptomatic cyst should be informed about the small risk of complication such as cyst rupture and the importance of seeking medical attention when the cyst become symptomatic.

Management is reserved for symptomatic popliteal cysts in addition to the underlying joint disorder when present. Many experts suggest that arthrocentesis of the knee and intraarticular injection with glucocorticoids is the recommended initial step in management of symptomatic popliteal cysts in adult patient with or without calf involvement. The approach is similar to that of osteoarthritis and rheumatoid arthritis. This intervention leads to a significant decrease in the size of the cyst and/or discomfort in approximately two-thirds of patients within two days to a week from the time of injection.<sup>2,12</sup> The mechanism is believed to be through inflammation control that reduce the pressure gradient between the joint and the cyst, lead to symptomatic improvement, and reduce the risk of recurrence.<sup>2,8,16</sup> Glucocorticoid injections alone can also be effective in patients with cysts but without joint effusions.<sup>2</sup> The literature lacks randomized trials that compare glucocorticoid injections with alternative treatment. However, an uncontrolled series of 30 patients with OA and a popliteal cyst that were treated with intraarticular glucocorticoid injections showed a reduction in cyst size in all patients and complete disappearance of the cyst in two patients.<sup>16</sup> Patients with a torn meniscus or other internal derangement can also benefit from arthrocentesis and a glucocorticoid

injection as it may provide temporary relief until definitive intervention can be readily performed.

If the initial arthrocentesis and injection with intraarticular glucocorticoids failed, the initial diagnosis of a Baker's cyst should be re-evaluated. Additional therapeutic measures may be necessary if the diagnosis is confirmed. Failed initial intervention may appear as failure to respond to an initial injection, persistent effusions, or recurrence of swelling after an initial response. In these patients, imaging studies as US and plain radiography should be performed if not already. Magnetic resonance imaging (MRI) should be used in patients in whom the diagnosis remains uncertain despite the initial methods. The idea is to reassess the anatomy of the cyst and popliteal mass and the relation to other structures and to identify underlying knee pathology that may be present. Another possibility that explains the failure of initial management is the presence of a torn meniscus, other internal derangement, or persistent joint inflammation. Repeat injection and additional procedures, if necessary, such as arthroscopic knee surgery or treatment with more potent medical interventions, should be undertaken to treat these patients, depending on the underlying knee condition prior to considering surgical excision.

Infrequently, popliteal cysts may not communicate directly with the joint space. In this uncommon circumstance, the patient will not respond to intraarticular injection. Hence, direct cyst aspiration and injection with glucocorticoid can be performed. Symptomatic non-communicating cysts that do not improve may require surgical excision. Popliteal cysts that do not associate with demonstrable joint pathology may require surgical excision. Thus, orthopedic surgeon should be consulted in patients with persistent symptoms or functional impairment with no response to initial injection and in whom knee pathology could not be identified.

In patients who do not respond to intraarticular injection, an ultrasound-guided direct aspiration of popliteal cysts, followed by injection of glucocorticoids, may be performed by clinicians skilled in this procedure.<sup>1,2,17</sup> This method can be attempted in patients found to have non-communicating cysts prior to surgical excision.

### Surgery

Surgical excision may be need in few selective cases when the cyst remains symptomatic with pain and/or limited function and movement related to the cyst

despite the treatment of underlying disorder and the administration of intraarticular glucocorticoids. Generally, surgical excision should only be reserved for situations where more conservative methods have failed and where there is severe functional dysfunction that can be traced to cysts. Surgical excision of Baker's cysts is typically a lengthy procedure. The operator should insure a wide visual access to be able to fully excise the cysts.<sup>1</sup> In addition, the operation carries the risk of difficult wound healing in the popliteal fossa and recurrence. Arthroscopic approaches include repair of the intraarticular abnormality with cyst removal or debridement of the connecting opening in the capsule.<sup>18</sup>

### CONCLUSION:

Risk factors for Baker's cysts include a history of trauma (33 percent) or a history of coexistent joint disease (67 percent). The diagnosis of popliteal cyst can be based on clinical examination alone. However, imaging studies may be needed in some patients in case of uncertain diagnosis or when another condition is suspected. Plain radiography and ultrasonography usually are the initial assessment modalities. Incidentally discovered cyst with no symptoms require no intervention. Management is reserved for symptomatic popliteal cysts in addition to the underlying joint disorder when present. Arthrocentesis of the knee and intraarticular injection with glucocorticoids is the recommended initial step in management of symptomatic popliteal cysts in adult patient with or without calf involvement. Surgical excision may be need in few selective cases when the cyst remains symptomatic with pain and/or limited function and movement related to the cyst despite the treatment of underlying disorder and the administration of intraarticular glucocorticoids.

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