

## Baker's Cyst In A 2 Year Old Child (Youngest Child Ever): A Rare Case Report

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**Abstract:** Popliteal cyst, or Baker's cyst, are considered rare in children and may exhibit particular features, as compared with adults. Baker's cyst are fluid filled cysts that result from extrusion of synovial fluid from the knee joint into the popliteal bursa, usually following minor trauma or pathologic processes of the knee joint. Baker's cysts most frequently are located in the bursa beneath the medial head of the gastrocnemius muscle or beneath the semimembranous muscle, these two bursae often coalesce, forming a gastrocnemius-semimembranous bursa. Primary baker's cyst usually occurs in children. They usually are asymptomatic and thus are typically found incidentally in children. These cysts do not have a persistent connection with the joint cavity and do not undergo significant enlargement. We hereby reporting our case of baker's cyst in 2 year old child with no associated joint abnormality as this is found to be youngest child to have baker's cyst after review of literature. Our patient had swelling in right knee since 6 months when patient reported to our hospital at the age of 2 years. We have managed our patient conservatively with careful neglect and regular follow up. Swelling completely subsided at 9 months follow-up. In conclusion, baker's cyst should always be kept in mind for swelling over posterior aspect of knee in this age group and need only conservative management if found not associated with any intra-articular pathology.

**Keywords -** Baker's cyst, popliteal bursa, gastrocnemius muscle, 2 year old, semimembranous muscle.

### I. Introduction

Baker's cyst represents common occurrences in adults while it is considered rare in children and may exhibit particular features, as compared with adults. A baker's cyst is a mass containing synovial fluid folded by synovial wall and it is located in popliteal fossa (1,2). First description of popliteal cyst is attributed to Adams in 1840, while eponym honors the work of Dr William Marrant Baker (1), a British surgeon who lived in 18th century. According to the best reliable theory, a Baker's cyst is the serous bursa of the tendons of the medial head of the gastrocnemius and semimembranosus muscles. It usually communicates with the joint by way of a slit-like opening of the postero-medial side of the knee joint capsule just above to the joint line. According to a different theory it is a simple extension of the synovial joint; in all cases the term "cyst" is inappropriate, as it is a synovial structure.

Baker's cyst is a common finding in adult imaging studies with a reported prevalence ranging from 10%-41% (3) and are commonly considered an epiphenomenon of underlying inflammatory or degenerative arthropathy in this age group. In contrast paediatric patients rarely exhibit baker's cyst. Reported prevalence ranges from 2.4% to 6.3% in paediatric population presented with knee pain (4,5). Baker's cyst formation in children is isolated and primitive in 95% of the cases (6). The idiopathic form affects children between 3 and 14 years old, twice as common as in males. Usually it is asymptomatic, but may cause discomfort and limitation of movements (7,8,9). In children, usually primary baker's cyst occurs. Primary cysts are thought to arise from minor trauma that either causes a connection between a weak area in the knee joint capsule and the bursa adjacent to it, or causes inflammation and enlargement of the bursa. The trauma may be as minimal as occurs with bumping the backs of the knees while sitting on a chair and swinging the legs. These cysts do not have a persistent connection with the joint cavity and do not undergo significant enlargement. But, controversy still prevails on the question whether baker's cyst in children communicate with the internal joint space or not.

Secondary baker's cyst, on the other hand, arise secondary to pathology in the joint cavity and thus are generally more symptomatic. They are more common in adults. Significant trauma, juvenile idiopathic arthritis, infections (especially Lyme disease), and malignancy have all been associated with secondary cyst formation. These cysts usually have a persistent connection with the knee joint, they can enlarge significantly and compress surrounding structures, most commonly the popliteal vein, which can result in thrombophlebitis. They may result in restriction of joint movement. Secondary baker's cyst may spontaneously rupture and result in significant inflammation and pain.

Diagnosis is based on clinical examination but imaging evaluation is important and ultra-sonography is a very helpful technique in the detection of a popliteal mass (9, 10). In current practice Baker's cyst are also, often, detected incidentally on MRI evaluations of the knee (11–13). Baker's cyst do not require treatment, more than 70% of cases resolves spontaneously over months or years with conservative treatment (13). Radioactive synoviorthesis technique can be used to treat inflammatory arthritides and hemophilia. Cyst excision can be adopted when a Baker's cyst is unresponsive to all other therapies while the recurrence rate is approximately 40%.

## **II. Case Report**

A 2 year old male presented to outpatient department of orthopaedics at ESI-PGIMS Model hospital Basaidarapur, New delhi with complaints of painless swelling over medial side of posterior aspect right knee (figure 1) which decreases in size with flexion at the knee in June 2014. In history part, patient had swelling since he started walking, first noticed by his father around the age of 1 ½ years. There is no history of any trauma, multiple joint pains and any pathology in right knee prior to swelling. On clinical examination, swelling found to be non-tender, compressible and trans-illuminating. With differential diagnosis of popliteal cyst, lipoma, xanthoma, aneurysm, vascular tumor, and other tumors in mind, patient advised to undergo ultrasound examination and MRI of right knee. Ultrasound right knee showed well-defined cystic lesion of 10 \* 18 mm size in popliteal fossa with most likely diagnosis of baker's cyst. MRI right knee showed no intra-articular pathology with a cystic swelling over medial aspect of posterior knee communicating with the knee joint and extending from the space between the tendons of the medial head of gastrocnemius muscle and the semimembranous tendon. Cystic swelling is liquid-isointense on T2w sequences and corresponding low signal in T1w sequences. Diagnosis confirmed with above mentioned clinical and radiological findings as Baker's cyst in our patient with 6 months of history. The patient's family was reassured that the boy required no treatment, as there is no positive past history and no intra-articular pathology, and requires only careful observation. The boy was managed with careful neglect and close follow-up. After 9 months of follow up, cyst found to be almost completely resolved.

## **III. Discussion**

In spite of long-standing, and continuing, controversies over the origin of Baker's cysts, this is thought to present protrusions of the gastrocnemius - semimembranous bursa and the sub-gastrocnemius bursa. Cysts confined to either the gastrocnemio-semimembranosus bursa or the subgastrocnemius bursa according to the MRI findings were classified as type I, and cysts which occupied both bursae were classified as type II. All type II cysts converted to type I with due course of time, and all cysts which completely disappeared converted to type I before disappearance (14). The question of whether Baker cysts in children communicate or not with the joint space is a matter of controversial discussions. In our case, baker's cyst was of type I variety and found to have communication with the joint on MRI study.

Trauma history may not be a frequent cause of Baker's cyst in children (5) but should nevertheless be considered. Some other rare causes of Baker's cyst, such as pigmented villonodular synovitis (15), or some conditions mimicking popliteal cysts, including popliteal artery aneurysm or venous aneurysm, popliteal deep vein thrombosis, or soft-tissue masses (16–18) should also be considered. No such causes found in our case on MRI study.

Fortunately, most Baker's cyst in children regress spontaneously or after successful treatment of the underlying pathogenic cause (19). For the time being, most sonographers will feel assured to diagnose a popliteal cyst if they can demonstrate a cystic lesion in the medial popliteal fossa with the typical slit-like curved apex in close spatial relation to the postero-medial knee joint space as seen in our case.

In conclusion, Baker's cyst, though generally rare in children, show a relatively high prevalence in certain paediatric subpopulations, namely, in patients with arthritis and benign joint hyper-mobility syndrome. Clinical examination can effectively limit the number of false-negative imaging studies performed for Baker's cyst. The diagnosis of Baker's cyst can be established on ultrasound with high diagnostic accuracy, which generally is sufficient for the diagnostic workup of popliteal swelling. Cysts with echogenic internal signal are a frequent finding in arthritic knee joints and should trigger further diagnostic steps in children without known history of arthritis. Magnetic resonance imaging supports diagnosis in these patients and facilitates whole-organ assessment. Most of baker's cyst in children resolves completely with time on conservative management. Only few cases with some intra or extra-articular pathology need some kind of surgical management.

Informed consent was obtained from the patient included in our case report.

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## Legends of figures-

**Figure 1-** clinical photograph of the patient.

