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Mini Review

Ganglion Cyst- An Unsolved Mystery

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Abstract

Most often found in the hand and wrist, ganglion cysts are benign, fluid-filled lumps that usually form around tendons or joints. They are believed to result from irritation of the joints or tendons, which causes the buildup of synovial-like fluid, though the precise reason is yet unknown. Although ganglion cysts are often painless, in certain situations they may cause discomfort, limited mobility, or nerve compression. Usually, a physical examination and imaging methods like MRI or ultrasound are used to make the diagnosis. For recurrent or symptomatic cases, treatment options range from surgical excision to conservative care, which includes observation and aspiration. Although usually not dangerous, recurrence is frequent, thus long-term monitoring is crucial. To better understand their etiology and improve treatment approaches, more research is required.

Keywords: Ganglion cyst; Herbal ointment; Synovial fluid

Introduction

Noncancerous, fluid-filled swellings called ganglion cysts frequently form close to joints and tendons, especially in the ankle, foot, hand, and wrist. In hand and orthopedic surgery, they are some of the most common soft tissue masses seen. The thick, gelatinous substance found in the cysts lubricates tendons and joints and is comparable to synovial fluid. Ganglion cysts are thought to be caused by degenerative changes, trauma, or inflammation of the joints or tendons, though the precise reason is yet unknown. Some ganglion cysts can cause pain, discomfort, or restricted movement, especially if they impinge on surrounding nerves, but many are asymptomatic and may go away on their own. The primary method of diagnosis is clinical, although imaging methods like Magnetic Resonance Imaging (MRI) or ultrasound are frequently included for confirmation. Depending on the degree of symptoms and likelihood of recurrence, treatment options include surgical excision, aspiration, or observation. Long-term management is crucial in-patient care because, even though ganglion cysts are benign, they often return [1-5].

Types of Ganglion Cysts

Ganglion cysts can be categorized according to their origin and location. Among the most prevalent kinds are:

Dorsal wrist ganglion cyst

Generally, starts at the scapholunate joint and manifests on the dorsal side of the wrist. Most prevalent ganglion cyst kind. They might vary in size and are frequently hard and spherical.

Volar wrist ganglion cyst

Appears on the wrist's Volar side, or palm side, typically next to the radial artery. Although less frequent than dorsal wrist cysts, they could nonetheless be uncomfortable or impair wrist mobility. Because of the close proximity to important blood vessels, caution is required during therapy.

Mucous cyst

Forms close to the fingers' Distal Interphalangeal (DIP) joint. Usually connected to joint deterioration and osteoarthritis. May compress the underlying structures, resulting in nail abnormalities or pain.

Tendon sheath ganglion cyst

Originates from a tendon's sheath, usually seen in the fingers. Frequently compact, sturdy, and movable. May be uncomfortable, particularly while moving the hands.

Foot and ankle ganglion cyst

Grows around the foot or ankle's tendons or joints. May result in pain from movement or pressure from shoes. If symptomatic, removal might be necessary [6-11].

Pathophysiology of Ganglion Cyst

Although the precise pathophysiology of ganglion cysts is yet unknown, it is thought to be caused by inflammation of the joints or tendons, which results in fluid buildup and mucinous degeneration. A number of important mechanisms have been put up to explain how they originate and develop:

Synovial herniation theory

According to this view, ganglion cysts develop when the synovial lining of a joint or tendon sheath herniates or protrudes. The joint capsule may degenerate as a result of repeated micro trauma or mechanical stress, causing synovial fluid to leak out and create a cystic structure. Fluid exchange is possible because the cyst is still attached to the joint by a pedicle [7-12].

Myxoid degeneration theory

Independent of direct joint communication, ganglion cysts develop as a result of connective tissue deterioration. As fibroblasts shift metaplastically, they produce too much hyaluronic acid, which builds up in the extracellular matrix and creates a cyst filled with gelatinous fluid. According to this view, some cysts are not directly associated with tendon sheaths or joints [8,13].

One-way valve mechanism

A one-way valve system, in which joint fluid is driven into a cystic cavity but is unable to return to the joint, may cause the cyst to form. As fluid builds up over time, this mechanism causes the cyst to gradually expand [3,9,14].

Role of inflammation and trauma

An inflammatory reaction brought on by trauma, repetitive stress, or unstable joints can result in an increase in synovial fluid production and the subsequent development of cysts. Prolonged irritation may also increase the synthesis of mucin and fibroblasts, which can lead to the growth of cysts [9,15].

Histological features

Ganglion cysts are encased in a thick, fibrous capsule rather than having a genuine epithelial lining. Collagen fibers are haphazardly organized, and fibroblasts are dispersed throughout the cyst wall. Hyaluronic acid and other mucopolysaccharides are abundant in the thick, viscous cystic fluid [16,17].

Epidemiology of Ganglion Cysts

One of the most prevalent benign soft tissue tumors, ganglion cysts primarily affect the hand and wrist. Age, sex, and occupation are some of the variables that affect their prevalence.

Prevalence

a) Ganglion cysts account for 50-70% of all soft tissue masses in the hand and wrist.

b) The estimated incidence is 19 to 43 cases per 100,000 people annually in the general population [18].

Age distribution

a) Rare in youngsters, but when present, they are typically congenital; most frequently observed in people between the ages of 15 and 40.

b) Because they are linked to osteoarthritis, mucous cysts a form of ganglion cyst seen in fingers are more prevalent in those over 50 [8].

Gender Predilection

a) More frequent in women, with a female-to-male ratio of approximately 3:1.

b) This is especially true for wrist ganglion cysts.

Risk factors

a) Repetitive wrist motion or joint stress, common in athletes, manual laborers, and those with occupations requiring frequent hand movements (e.g., typists, musicians).

b) Previous trauma or joint injury, which may contribute to synovial fluid leakage and cyst formation.

c) Osteoarthritis, particularly in older adults, increases the risk of mucous cysts in the fingers. [2,3].

Recurrence rate

1. Ganglion cysts can spontaneously regress, persist, or recur after treatment.

2. Recurrence rates vary based on the treatment method:

a. Aspiration: Up to 50% recurrence.

b. Surgical excision: Recurrence rates range from 5% to 15%, depending on complete removal of the cyst and its stalk.

Ganglion cysts, though benign, can impact daily activities, particularly in symptomatic cases, making their epidemiology important for understanding risk groups and treatment planning [14].

Available Treatment for Ganglion Cysts

Treatment for ganglion cysts depends on factors such as symptoms, size, location, and recurrence risk. Options range from conservative management to surgical intervention.

Conservative management (observation & home remedies)

A. Watchful waiting: Many ganglion cysts are asymptomatic and may resolve spontaneously without treatment.

B. Activity modification: Reducing repetitive wrist or joint movement can prevent cyst enlargement.

C. Immobilization: Wearing a splint or brace may help relieve discomfort by reducing joint motion, though prolonged use is not recommended as it may lead to stiffness [7].

Aspiration (needle drainage)

1. A syringe is used to drain the gelatinous fluid from the cyst.

A. Advantages:

a) Minimally invasive, quick procedure.

b) Provides temporary relief of symptoms.

B. Disadvantages:

a) High recurrence rate (up to 50%), as the cyst lining remains.

b) Risk of infection or recurrence of fluid buildup [19,20].

Corticosteroid injection

A. Sometimes combined with aspiration to reduce inflammation and recurrence risk.

B. Limited effectiveness in preventing recurrence [21].

Surgical excision

Recommended for persistent, painful, or recurrent cysts.

A. Procedure:

a) The cyst, along with its stalk (connection to the joint or tendon sheath), is surgically removed.

b) Performed under local or general anesthesia, depending on the location.

B. Advantages:

a) Lower recurrence rate (5-15% compared to aspiration).

b) Provides long-term relief.

C. Disadvantages:

Surgical risks include infection, stiffness, nerve damage, and scarring [7,21].

Alternative Therapies (Less Common)

A. Needle fenestration/multiple puncture technique: Involves puncturing the cyst multiple times to promote fluid absorption.

B. Laser therapy or sclerotherapy: Experimental treatments with limited data on long-term effectiveness [2,8].

Historical method (not recommended)

1. "Bible Bump" Method (Blunt Force Trauma):

a) An outdated practice where people would hit the cyst with a heavy book to rupture it.

b) Not advised due to risks of injury, nerve damage, and recurrence [16].

Treatment selection

a) Small, asymptomatic cysts: Observation.

b) Symptomatic but non-severe cysts: Aspiration or corticosteroid injection.

c) Large, painful, or recurrent cysts: Surgical removal.

While ganglion cysts are benign, treatment choice should consider recurrence risk, patient symptoms, and functional limitations.

Conclusion

Ganglion cysts, while benign, can have a major influence on a patient's quality of life due to pain, functional limitations, or cosmetic concerns. Clinical diagnosis is frequently sufficient; however, imaging is useful in more complex instances. Treatment should be tailored to the patient's specific symptoms, cyst location, and expectations. Advances in surgical and non-surgical treatments continue to improve results and decrease recurrence. A greater emphasis on patient-centered care, psychosocial support, rehabilitation, and preventive measures can improve long-term outcomes and patient satisfaction.

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