Controversies in the Management of Digital Mucous Cysts

Ryan Bhagwandin, BS,* Jacqueline Thomas, DO, FAOCD,** Scott Greenberg, DO***

*Medical Student, 2nd Year, Nova Southeastern University College of Osteopathic Medicine, Ft. Lauderdale, FL
**Assistant Professor, Nova Southeastern University College of Osteopathic Medicine, Ft. Lauderdale, FL; Assistant Program Director, Dermatology Residency, NSU/Broward General Medical Center, Ft. Lauderdale, FL
***Clinical Assistant Professor, Orthopedic and Hand Surgery, Nova Southeastern University College of Osteopathic Medicine, Ft. Lauderdale, FL; Private Practice, Naples, FL

Abstract

Digital mucous cysts are benign, solitary, oval nodules that typically manifest on the dorsal aspect of the distal interphalangeal joint.1-4 The management of digital mucous cysts differs between the fields of dermatology and orthopedic surgery. Dermatologists treat the cysts in a conservative manner that minimizes patient side effects and risk of scarring. Dermatologic treatment modalities such as sclerotherapy and cyst excision have cure rates over 80%. Alternatively, orthopedists’ main preferences are more aggressive form of surgical treatment, which have remarkable cure rates. Orthopedic cure rates are over 90% when using techniques such as osteophyte debridement and synovectomy. Average recurrence rates for dermatologic treatment are 30%, while orthopedic recurrence rates are below 10%. There are no prevailing guidelines in the treatment of digital mucous cysts. Both treatment methodologies offer effective care to the patient; however, physician recommendations should be determined on a patient-by-patient basis.

History

Digital mucous cysts were first described in 1883 by Hyde, characterized as synovial lesions of the skin.1,4,5 Hyde described these lesions as “pseudo-vesicles and bullae” and determined that they have a direct connection to the bursa of the synovium.6,7 Orthopedic surgeons share this belief and aim to destroy the connection between the synovium and cyst.

Alternative names for digital mucous cysts are: myxoid cysts, synovial cysts, mucous cysts, and myxomatous cutaneous cysts.1,3,6-8 These cysts commonly present as solitary, oval, smooth nodules near the distal interphalangeal joint.1,13 Subungual mucous cysts and multiple mucous cysts are rare occurrences.9,11

Mucous cysts tend to affect individuals between 50 and 70 years old; presentation before age 50 is commonly associated with a previous major injury to that digit.3,4 Women are affected more often than men, with a ratio of 5:1.2,12 Although mucous cysts affect every race, they are especially prevalent among Caucasians.4

Anatomy and Physiology of Digital Mucous Cysts

Mucous cysts primarily arise from two main causes. The first is associated with the degeneration of the distal interphalangeal joint, and the second comes as a result of excessive hyaluronic acid produced from fibroblasts.9,13 Mucous cysts associated with the former are the ganglion type, while the latter is the myxomatous type.2,10 Although called mucous cysts, these nodules lack an epithelial lining and cyst wall, making them technically pseudocysts.10,14,15

Digital mucous cysts are located on the distal interphalangeal joint of fingers and toes (Figure 1). The position of the cyst is lateral to the midline on the dorsal side of the digit (Figure 2). This is due to the extensor tendon that runs along the midline of the finger, displacing any potential cyst that might occur there.8 Mucoid cysts appear to have a definite border when examined externally, but histologically contain a steady transition from a fibroblast-dense area of the cyst to the typical collagenous tissue of the skin.4 Microscopic examination of the cyst demonstrates increased fibroblast proliferation and a loose matrix.4 Fibroblast proliferation leads to a rise in hyaluronic acid, which is one of the contributing factors to the formation of digital mucous cysts.9,13

Subungual mucous cysts are located beneath the nail plate, as the name implies, and can affect the nail matrix, causing several nail pathologies.10 Interaction between digital mucous cysts and the nail matrix can lead to alteration of nail integrity, curvature, and color.10 Treatment of the cyst can resolve complications of the nail matrix, leading to correction of nail deformities.11 Failure to remove any attachment between the cyst and the connected joint capsule may further contribute to recurrence of the cyst.16

Irregular articular joint surfaces caused by osteophytes, as in arthritis, promote damage to the joint capsule, leading to points of weakness.9,13 The deterioration of these points allows fluid to escape, potentially forming digital mucous cysts.9,15 Failure to remove the osteophytes from the joint may further disrupt the joint capsule and lead to recurrence.16

Therapeutic Approaches to Digital Mucous Cyst Management

The dermatologic and orthopedic surgery management philosophies aim to treat patients using different techniques. X-rays of the cyst are routinely taken in order to confirm the presence of osteophytes or other pathology.15 Patients with digital mucous cysts who do not demonstrate any symptoms such as pain or major nail deformities may be advised to simply observe the cyst.13 These types of patients routinely present to physicians for cosmetic purposes.

Dermatologic Approach to Therapy

Dermatologic management of a digital mucous cyst is primarily comprised of non-operative treatment methods. These therapies range from
minor office procedures such as observation to complete excision of the cyst. These techniques tend to be aesthetically pleasing and are associated with a low recurrence rate. More aggressive management of digital mucous cysts increases the possibility of complications.

Puncturing a mucous cyst is the starting point in various treatments. The initial step of puncturing involves determining the limits of the cyst through palpation. Once the cyst is punctured and the contents aspirated, the cure rate is up to 72 percent after two to five treatments. Validation of the digital mucous cyst diagnosis can be confirmed by the presence of clear, semi-viscous fluid removed from the cyst. A majority of incompletely cured mucous cysts are downgraded to asymptomatic nodules. After the contents of the cyst are vacated, the cyst can be injected with a steroid mixture. Steroid injection is a common method of treatment used for myxomatous cutaneous cysts and is frequently paired with aspiration or cyst puncturing. The recommended initial solution for steroid injection contains 0.2 mL of 1% lidocaine and 0.2 mL of triamcinolone acetonide. Triamcinolone is used to suppress fibroblast secretion, one of the main causes of digital mucous cysts. Hyaluronidase has been injected in the cyst and is thought to chemically remove the contents, although it has been noted to be unsuccessful in some studies. Dodge et al. reported that 64 percent of cysts were cured by either aspiration or decapping combined with a local steroid injection. The remaining 36 percent of cysts recurred within four years. A 2003 study by Rizzo and Beckenbaugh found that 48 out of 80 patients treated with multiple cyst punctures and injected with 1 mL of 1% lidocaine experienced successful regression. The remaining 32 patients had the cyst recur. Decreased mobility of the joint and infection are complications accompanying steroid injection with aspiration or multiple punctures.

Another therapy used to treat digital mucous cysts is cryosurgery. The cyst roof is opened and drained, and liquid nitrogen is then applied directly into the cyst cavity. This allows for liquid nitrogen to be applied directly into the cyst. A double cycle of quick-freeze, slow-thaw is proposed in order to increase the effectiveness of the treatment, since single freeze–thaw cycles have been associated with higher rates of recurrence. The cure rates of cryosurgery range from 56 percent to 86 percent. The rate of recurrence ranges from 10 percent to 15 percent. Complications of cryosurgery are relatively minor, including hemorrhagic blister formation and discomfort.

An increasingly popular therapy for the treatment of digital mucous cysts is carbon-dioxide vaporization under a digital block at a power of 5 watts to 10 watts. Once punctured, the contents are squeezed out, yielding a clear, jelly-like liquid. Next, the cyst is completely vaporized using the carbon-dioxide laser. The cyst is treated with hydrogen peroxide and then reexamined to ensure no traces of the cyst are left behind. Caution is exercised in order to not damage the nail matrix, which could potentially lead to nail deformities. In 1999, a study by Karrer demonstrated that 66 percent of patients were cured by carbon-dioxide laser vaporization. Two patients had the cyst recur, one at three weeks and the other at 11 months, after therapeutic treatment. Karrer also noted no complications from the carbon-dioxide vaporization. However, scarring, superficial erosion, and infection can occur postoperatively. The rate of bacterial infection with conventional lasers is extremely low, between 0.5 percent and 4.5 percent, while fractional laser vaporization has a reported infection rate of 0.1 percent.

Sclerotherapy is also used to treat digital mucous cysts. Sclerosants are detergents, chemical agents, and osmotic agents that disrupt the cellular membrane. Before the cyst is injected with the sclerosant agent, the cyst is aspirated to remove mucinous contents. Polidocanol is a detergent used as a sclerosant associated with positive aesthetic outcomes and low risk
A more aggressive method used is a simple excision of the cyst with surgical closure. Although this technique produces outcomes that are aesthetically pleasing, it is highly associated with recurrence of the cyst.13,29 A U-shaped rotational flap is created to encompass the cyst, although in the presence of multiple cysts the location of the flap is based upon the largest cyst.13,15 The cyst is then incised, the contents are extracted, and the cyst is finally curetted.15 The flap can be left to heal on its own or sutured into place.13,15 Lawrence et al. demonstrated a cure rate of nearly 90 percent in fingers and 33 percent in toes.15 The rate of recurrence in this study was less than 10 percent in fingers and 66 percent in toes.15 Importantly, there was no skin excision or osteophyte removal during this process.13 This procedure has been limited to few complications such as pain, infection, and limited joint movement.15

According to Lawrence, raising a flap to include tissue of the cyst and distal interphalangeal will result in scarring.15 The scar will seal the joint and prevent synovial leakage that may have contributed to the cyst.15 A major distinction between dermatologic and orthopedic surgical techniques is the contribution of osteophytes to the recurrence of the digital mucous cyst. This discrepancy is the foundation of orthopedic management for digital mucous cysts.

Orthopedic Approach to Therapy

The orthopedic management of digital mucous cysts consists of more aggressive techniques of treatment. While dermatologists opt for less-invasive therapy and have a variety of treatment methods, orthopedic surgeons follow a stricter protocol. The approach of orthopedic surgeons increases the chance for post-operative complications but is correlated with an extraordinary success rate.9 Osteoarthritis is particularly associated with the prevalence of digital mucous cysts, with up to a 78 percent occurrence.9,10,12

The most conventional treatment among those of the orthopedic field is mucous-cyst excision and debridement of osteophytes in the distal interphalangeal joint.13 This therapy is very successful, with over a 90 percent cure rate.33 The recurrence rate is 3 percent to 12 percent for cyst and osteophyte excision.3 One approach described by Shin and Jupiter calls for an extended dorsal flap to help in the removal of larger cysts.33 In this process, the cyst stalk is excised along with the dorsal capsule and synovium.33 Dorsal osteophytes are also removed to help prevent recurrence of the cyst.33 The triad of skin excision, synovectomy, and debridement of osteophytes of the distal interphalangeal joint leads to a 100 percent cure rate with no recurrences of the mucous cyst.8 Complications include infection, nail deformity, swelling, and damage to the extensor tendon.3,8,13

An elliptical incision is commonly made when excising the mucous cyst and its components.31 Although in many cases the scar heals well and no skin graft is needed, a larger cyst may require a graft or flap.

Discussion

The dermatologic and orthopedic approaches vary in their methodology but have the same goal. Table 1 illustrates the cure rates of dermatologic and orthopedic treatment. The dermatologic management of digital mucous cysts begins with less-invasive treatments such as puncturing, aspiration and steroid injection. Puncturing and aspirating the cyst has been associated with high recurrence rates and a cure rate of over 70 percent. Recurrence rates of dermatologic and orthopedic treatments can be found in Table 2. Other beneficial and aesthetically pleasing treatments are carbon-dioxide vaporization and cryosurgery. Both therapies are recommended after failure of the cyst to respond to other less-aggressive treatment modalities. Sclerotherapy also displayed impressive cure rates, with over 90% of patients being cured, as shown in Table 1. Steroid injection of the mucous cyst displayed less than an ideal cure rate of 60 percent, even after multiple injections. Another limitation to this treatment is the lack of a standard steroid used. There are many options, each with its own benefit, though the absence of a definitive steroid may lead to mismanaged treatment. The therapy with the top cure rate is surgical excision along with osteophyte debridement and synovectomy. This technique also provided patients with a zero percent recurrence rate, as depicted in Table 2. Although this method has the best cure rate, it does not come without risks. By performing surgery, the potential for nail deformities, post-operative pain, and limited post-operative functional use of the joint is increased.12 Once the less-intrusive alternatives have been unsuccessful, cyst excision along with osteophyte debridement is recommended to treat the patient. Overall, the average orthopedic cure rate is 95 percent, compared to the average dermatologic cure rate of 73 percent.

The preference of treatment for the patient can vary upon many factors. The cost of treatment can significantly impact the choice the patient makes. Another major factor in deciding among treatment options is the likelihood of morbidity after the procedure.

Conclusion

The digital mucous cyst is a prevalent condition with a controversial treatment profile. While the methods of therapy have a common goal, the routes to achieving that objective differ in degree of destruction and complication. While both the orthopedic approach and the dermatologic approach are acceptable options for care, specific points should be considered and reviewed with the patient during the decision-making process. Both approaches have benefits and drawbacks, different levels of intensity of involvement of care, different costs, and different prognoses. Orthopedic surgeons have documented high cure rates with surgical excision and osteophyte debridement. The risk for post-surgical complications are increased, and the procedures are more involved, but the prognosis is improved. The dermatologic perspective leads to an aesthetically pleasing result with low risk of complications and less intensity of involved procedures, but with a potentially worse prognosis. All treatments should be carefully deliberated upon before a selection is made. There is no standard treatment recommended to patients, allowing for a multi-disciplinary approach to patient care with dermatology, orthopedic and hand surgery for both initial and later management. Patient discussion of these concepts will allow for arrival at the best decision for each patient, with realistic expectations and no misunderstandings.
References


Correspondence: Jacqueline Thomas, DO; jacquie.thomas@comcast.net