BLUE TOES, SAUSAGE TOES, AND OTHER FUNKY-LOOKING DIGITS

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BLUE TOES

Blue toes are always a cause for concern. Skin color is attributed to blood in the vessels of the dermis and subpapillary region. Therefore, blue toes represent internal changes in blood circulation. The amount of blood circulating and the color of the blood are the two factors that influence the color of the skin. The color of blood signifies its oxygen concentration, with poorly oxygenated blood appearing darker than oxygenated blood. Local cyanosis always indicates decreased blood flow and is always associated with oxygen loss. A blue toe represents stasis from poor arterial flow or sluggish venous return.

Blue toes which occur early in the postoperative period represent a major concern for the surgeon. The surgeon must recognize, diagnose and treat the blue-toe condition in a timely and appropriate manner in order to avoid complications such as excessive swelling, hematoma, infection, fibrosis, gangrene, atrophy or total loss of the toe. Three post surgical possibilities exist: arterial insufficiency, venous insufficiency, and dissecting hematoma.

Arterial Insufficiency

The toe may be pale or even blue. The key clinical finding is that the toe is cold and it does not blanch after pressure. In the early stages the digit has good turgor and no signs of cellular death. As time goes on, the toe will either improve or become gangrenous, depending upon the treatment rendered and the initial reversibility of the process.

Causes of arterial insufficiency in the postoperative period include: excessive lengthening of the digit (actual or relative); excessive surgical trauma with possible disruption of arterial supply; excessive fluid tourniquet; over-zealous use of epinephrine; excessive postoperative swelling; constrictive dressings; and vascular impingement due to positioning. Advanced patient age, cases of revisional surgery, prior ischemic disease, or debilitating diseases such as rheumatoid arthritis with or without associated vasculitis, are additional factors that can contribute to arterial insufficiency. Particular situations such as syndactyly or congenital abnormalities and certain medication effects or idiosyncracies such as those seen with tricyclic anti-depressants should also be considered.

Proper treatment in these specific cases begins with close, immediate observation with supportive measures for the initial postoperative course. No ice should be applied to the affected part, and the foot should be initially maintained in a horizontal position, parallel to the trunk without dependency. Reflex heat can be utilized to the popliteal fossa or the low back area. The patient should be instructed to avoid all caffeine and nicotine. Consideration should be given for removal of constrictive dressings and extirpation of Kirschner wires. The physician may also consider using an Alpha blocker, such as Phentolamine (Regitine to affect reversal of effects of epinephrine and norepinephrine), or an oral vasodilator such as Niacin and Cyclospasmol.

In emergency situations where pallor and cyanosis continue to exist over three to six hours, one should consider Vasodilan 5 to 10mg. IM

(Isoxsuprine) or 10mg. of Nifedipine (Procardia) orally or sublingually. These medications may provide the necessary vasodilation. Primarily, one should consider the cause of the vascular insufficiency and attempt to reverse it.

Venous Insufficiency

Postoperative blue toes can also be of venous etiology and represent the slowing of blood and its subsequent deoxygenation. The classic appearance is that of a warm, blue toe following digital or neuroma surgery. Etiology of venous insufficiency causing blue-toe syndrome, includes local trauma, with or without surgery and sympathectomy effects and perhaps, local edema and constrictive dressings.

The toe is usually blue immediately following the surgery and may even blanch on pressure with immediate capillary refill. More severe types do occur which do not blanch on pressure and may progress to patchy gangrene or even total circulatory shut-down over the next 24 to 72 hours.

Initial therapy after recognition of the cause of the blue toe, includes inspection the dressing for tightness, placing the foot parallel to the trunk, and perhaps the later use of bed elevation. Under no circumstances should one attempt to increase the vascular perfusion of the toe, as this may lead to potentially irreversible changes in the digit due to increased venous insufficiency.

Dissecting Hematoma

A dissecting hematoma describes excessive bleeding between layers of the subdermal skin. Bleeding begins at the time of surgery and dissects along the fascial planes of least resistance. Usually this occurs along the incision line and may dissect further proximally and distally. It is also seen typically at the pulp of the toe where a K-wire may exit. The superficial tissues are therefore removed or suspended from their underlying blood supply and subsequently undergo necrosis with eventual sloughing. The underlying tissues remain viable, however, the visual appearance is that of gangrene and tissue loss. Initially, the toe may appear cyanotic, however, this cycle continues until a blue-black toe develops. The condition may be local or may continue to involve the majority of the toe. There is no blanching and the clinical picture worsens until the superficial layers of the toe harden and atrophy. The initial extent of damage or tissue loss is variable and at times unpredictable. The toe is warm to the touch unless enough eschar is present over the toe to prevent accurate assessment of its temperature.

The initial diagnostic impression is important, as treatment for arterial insufficiency may make this condition worse. Transillumination of the toe may be helpful in its initial assessment. If fluctuance is noted initially, then a dissecting hematoma should be considered in the diagnostic impression and perhaps needle aspiration may be appropriate.

Blue Toes Of Uncertain Etiology

Blue toes that occur without any prior trauma must be studied carefully, as they represent micro-embolization from atheromatous plaques of the major arteries of the affected foot. In 70% of these instances, they arise from the superficial femoral artery or the popliteal artery, however, they may arise from the iliac vessels or unsuspected abdominal aortic aneurysm. The emboli are of fibrino platelet nature and the embolus most commonly enlarges in a digital arterial bifurcation, causing circulatory embarrassment to one or two digits. The toes are cyanotic and painful. This condition is known as blue toe syndrome and must be recognized and treated to avoid irreparable harm or loss of the foot.

SAUSAGE TOES

Sausage toes present with excessive edema of a digit, greater than that usually encountered following a surgical procedure. The condition is usually uncomfortable or painful and the continued swelling and pain can result in excessive fibrosis of the toe.

The condition is not typically seen immediately following surgery during the time of initial bandaging (week 1 through 3). After removal of the surgical dressings, the toe slowly enlarges so that it is noticeably edematous and painful. Theoretical causes include loss of venous channels and lymphatics which are important in drainage. However, excessive surgical trauma is also an important and implicated etiologic component.

Treatment includes digital compression with self-adherent wraps and local physical therapy. The condition is normally reversible, however, should be treated aggressively in the early post-operative period. Most sausage toes return to normal after approximately 10 to 12 weeks, however, one may persist for an uncertain period of time.

FUNKY LOOKING DIGITS

Common digital deformities include mallet toe, curly adducto varus toes, claw toes, shortened and contracted toes associated with brachymetatarsia, hammer toes associated with posterior equinus or neurologic disease, flexor plate dislocation associated with hallux valgus and toe deformities associated with primary metatarsal phalangeal joint disorders. These are not funky toes, but toe deformities that we expect to see and treat in our daily practice.

Funky toes are usually traumatic in nature and frequently are iatrogenic. The nature and extent of these deformities is dependent on a variety of factors. The specific surgical procedure performed, the amount and location of bone removed, the extent of soft tissue, tendon, and capsular disruption, the amount of scarring and fibrosis and contracture, the extent of proximal metatarsal damage or displacement as well as other associated conditions or deformities of the proximal foot segment all have a bearing on the deformity.

Many of these digital deformities are sagittal and transverse in nature. Sagittal plane digital deformities can follow multiple arthroplasties, especially when they are performed in an uncontrolled foot, or without stabilization. Sagittal plane digital deformities also follow excessive bone resection of the toes, base resections, thoughtless tenotomies and irreparable soft tissue trauma with loss of function subsequent fibrosis, contraction and scarring. Other causes include metatarsal osteotomies with dorsiflexion or shortening, metatarsal head resections and condylectomies.

Transverse digital deformities are more rare, however, these represent severe deformities which are due to similar factors, coupled with excessive instability of the toe itself or neighboring part in a medial or lateral direction. Reconstruction of these deformities carries significant risks, especially neurovascular compromise. Frontal plane deformities are less common and are normally seen secondary to poorly-fused or arthrodesed digits.

Each deformity must be addressed separately to include other associated deformities or conditions. Muscle tendon function must be assessed with utmost care and the decision made to reconstruct or salvage the deformity. Direct digital reconstruction usually consists of revisional arthrodesis as deforming influences can not always be totally eliminated and the total return of normal intrinsic and extrinsic muscle function often not accomplished. Further surgical reconstruction and/or stabilization may take the form of syndactyly and is usually performed as a secondary procedure so that vascular compromise does not ensue. The result of surgical reconstruction should be the creation of a plantargrade and stable weightbearing foot. Direct and total active function is always sought, however, in many cases, this is never regained.

After surgical reconstruction or salvage has been accomplished, appropriate layered wound closure is performed to decrease the possibility of further scarring and contracture. Dressings are carefully placed to control postoperative inflammation and edema which again are precursors of soft-tissue fibrosis and subsequent contracture. Edema is carefully controlled throughout the entire postoperative period and fixation devices, whether external or internal, should be stable and left in place for an appropriate period of time until stability of the part is maintained independently. Aftercare is closely monitored through physical therapy and attempts to control swelling. The patient should be then followed with biomechanical support where appropriate as well as the use of digital retainers and prescription shoes. Further surgery may also be expected and scheduled as needed.

Reconstruction of deformities of the forefoot following previous poorly-executed or poorly-thought-out surgery, is a challenging, but rewarding area.

BIBLIOGRAPHY

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