Case Report: Surgical Approach for Avascular Necrosis due to Caisson’s Disease

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Disclosure

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AAOS

My disclosure is in the Final AOFAS Program Book. I have no potential conflicts with this presentation.
Case Report

- F/60
- C/C: Bilateral Ankle Pain (Lt < Rt) for 18 months
- P/I: Patient had Non-steroidal Anti-inflammatory Medication
- PMH: No Significant History, No History of Trauma, No History of Foot and Ankle Surgery
- Social: 15 years of Deep Sea Diving, 120 Dives, 105 feet
- Physical Exam: Dorsiflexion and Plantarflexion of Bilateral Ankles: Less than 5 degree due to severe pain. Severe Pain on Talus Bilateral Ankles
Case Report

- Radiographic Findings
  - Mild Degenerative Changes
  - Slight Narrowing of the Ankle Joints
  - No Significant Subchondral Sclerosis or Cyst Formation
Case Report

- MRI Finding
  - Old and Well – Circumscribed Avascular Necrosis.
  - Non – Displaced Fracture of the Talus.
Case Report

• Impression: Avascular Necrosis of Talus due to Caisson’s Disease

• Plan
  - No Weight Bearing on Left foot with Crutches
  - Bone Stimulator Units to expedite the bone healing
  - Bone Stimulator Units for 3 months
Case Report

- External Bone Stimulator
  - For 3 to 6 months
- Ankle Inflammation has decreased
- Consolidation on talus noticed
- Smaller size of cyst with more well demarcation
- Reduced Swelling, Increased Range of motion on Bilateral Ankles.
Case Report

• Patient was re-evaluated for Vascularized Bone Transport
  - Not a candidate for vascularized bone Transport
• Attempt Retrograde Hindfoot Intramedullary Nail and Proximal Tibial Bone Grafting.
• Post Operative Treatment
  - 12 weeks of Right Below Knee Cast with No weight Bearing
  - 4 weeks of CAM Walker with Weight Bearing with Crutches
Discussion

• Caisson Disease is so called Decompressive Sickness. Usually, it is caused by the bubble that is created secondary to rapid change in environmental pressure. The dissolved bubbles then permeate into the blood vessel or bone.

• 60 – 70% of symptoms is related to joint pain. Mostly, It will appear in large joints such as Shoulder, Elbow, Knee and Hip. Rarely, it appears in Ankle as well

• The major manifestation is the pain related to both active or passive motion.

• The specific risk factors are not well understood and some divers may be more susceptible than others under identical conditions [1,2]

• Lafforgue et al. reported Caisson Disease related to Bone Avascular Necrosis [3]
Discussion

- It is important to overview What is the more susceptible risk factors
  - Dehydration, Patent Foramen Ovale, Increasing Age, Previous Injury, Ambient Temperature, Body Type, Alcohol Consumption Etc.
- It is imperative to set up the standard time for the treatment of Caisson
  - Whether Avascular Necrosis happens within 24 hours?
- Nitrogen Bubble can cause Avascular Necrosis via intraluminal obliteration of blood vessel
- The effectiveness of Bone Stimulator?
  - Up to date, bone stimulator is applied onto long bone fracture.
  - It is still unknown for the exact mechanism of electrical stimulator
Conclusion

• There are literatures for the treatment of avascular necrosis via hyperbaric oxygen therapy but not via bone stimulator application.

• This case was avascular necrosis via Caisson Disease. According to patient history and MRI, this was no longer acute phase. Therefore, it would not be effective via hyperbaric oxygen therapy. Bone stimulator was applied to the patient ankle to consolidate any pathological fracture in talus or tibia plafond.

• There are only few studies for avascular necrosis due to Caisson Disease. Therefore, it is necessary to set up classification and standard of care in near future.


