CARDIOVASCULAR INNOVATIONS DIGITAL 2020

The Under Utilization of Chopart's Amputation

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- Direct Costs for Diabetes in the USA during 2017 was documented to be \$237 billion, which was a 26% increase from 2012.¹
- Approximately \$79 billion in direct cost attributed to diabetic foot disease has been documented.^{2,3,4}
- In 2015 direct costs associated with cancer in the USA was documented to be \$80.2 billion.⁵
- The five year mortality for major amputations (BKA or AKA) has been documented to be 56.6%, which is greater than the 5 year pooled (avg) data for all cancers combined at 31%.¹
- Significant components of mortality for major amputations is attributed to the severity of comorbidities which are often present such as cardiovascular and renal disease.⁶
 - 1. Armstrong D et al. Five year mortality and direct costs of care for people with diabetic foot complications are comparable to cancer. *Journal of Foot and Ankle Research.* 2020.
 - 2. Armstrong DG, Boulton AJM, Bus SA. Diabetic foot ulcers and their recurrence N Engl J Med. 2017; 376(24):2367-75.

- 4. Driver VR, Fabbi M, Lavery LA Gibbons G. The costs of diabetic foot: the economic case for the limb salvag team J Vasc Surg. 2010; 52(3 Suppl): 17S-22S
- 5. Economic Impact of Cancer. <u>https://www.cancer.org/cancer/cancer-basics/economic-impact-of-cancer.html</u>. Accessed December 22, 2019.
- 6. Lazzarini PA, Pacella RE, Armstrong DG, van Netten JJ. Diabetes-related lower-extremity complications are a leading cause of the global burden of disability. Diabet Med. 2018. https://doi.org/10.1111/dme.13680.

^{3.} The Cost of Diabetes ADA. <u>https://www.diabetes.org/resources/statistics/cost-diabetes</u>. Accessed December 22, 2019.

Considerations

- The more proximal the lower extremity amputation, the more significant the impairment to walk short and long distances and the greater the rate of oxygen consumption.¹
- Psychological effects of amputation can influence body image, selfesteem, and have a direct impact on postoperative rehabilitation.²

Pinzur MS. The metabolic cost of lower extremity ampuation. *Clin Podiatr Med Surg* 14:599-602, 1997.
Yoho RM *et al.* Chopart's Amputation: A 10 year case study. The journal of Foot and Ankle Surgery 47:326-331, 2008

History of Choparts

- In some sources Chopart's amputation is only utilized as a temporary procedure to stabilize a seriously infected foot until a Syme's or BKA can be performed.¹
- Historically Chopart's amputations have been a high failure rate procedure due to equinovarus deformity.
- Anterior tibial tendon transfer and Tendo-Achilles lengthening modifications have decreased the complication rates and result in greater satisfactory outcomes.^{2,3}



^{1.} Banks AS, Downey MS, Martin DE, Miller SJ. McGlamry's Comprehensive Textbook of Foot and Ankle Surgery. Volume 2, 3rd Edition 2001 by Lippincott Williams and Wilkins

^{2.} Yoho RM et al. Chopart's Amputation: A 10 year case study. The journal of Foot and Ankle Surgery 47:326-331, 2008

^{3.} Faglia E et al. Outcomes of Chopart amputation in a tertiary referral diabetic foot clinic: Data from a consecutive series of 83 hospitalized patients. The Journal of Foot & Ankle Surgery 55 (2016) 230-234

- According to Faglia E *et al*, a 2016 published retrospective study, 83 patients underwent a Chopart's amputation from 2009-2011 and were followed through December 31, 2012.¹
 - Resvascularization was performed when needed in patients prior to definitive amputation in patients with osteomyelitis and dry gangrene and prior to final wound closure in needed patients with abcess and wet gangrene.¹
 - The success rate was great enough to encourage considering Chopart amputations as a viable limb salvage option.¹
 - Chopart amputations "represent the last chance to avoid major amputations."

1. Faglia E *et al.* Outcomes of Chopart amputation in a tertiary referral diabetic foot clinic: Data from a consecutive series of 83 hospitalized patients. The *Journal of Foot & Ankle Surgery* 55 (2016) 230-234

HPI: 61 yo DM male initially presents to clinic with right foot ulceration. He has history of elective foot surgery followed by recurrent complications and postoperative infections.

PMH: DM and HTN

PSH: elective foot surgery, right foot digital amputations from surgical complications.

Social: no smoking history

LE Exam: right foot ulceration to bone/1st metatarsal with no acute signs of infection, but mal odor present. No purulence or erythema. Lesser right digits hypertrophic and elongated. Palpable popliteal and pedal pulses. Protective sensation completely absent.

Labs:

- Comprehensive Metabolic Panel= WNL
- WBC=5.5 K/cu mm
- HGB A1C= 6.0%
- ESR=73 MM/HR and CRP = 2.56 mg/dL



MRI Findings:

Ulcer on the plantar surface of the foot at the first metatarsal phalangeal joint region with soft tissue swelling in this region and osteomyelitis of the first metatarsal bone and the first proximal phalanx.



- Chopart Amputation with anterior tibial tendon transfer to the lateral dorsal aspect of the talar neck with a percutaneous Tendo-Achilles lengthening
- IV Zosyn while inpatient
- All infection removed with amputation. Clean margins from pathology.
- Length of stay 4 days
- Completely healed 4 weeks and sutures removed and fitted for shoes and prosthetic.
- Completely ambulatory at 12 year follow up. Patient states, " My life didn't change at all when I got my amputation. I still did all the things I did before!"



52 yo DM male w/history of healed right TMA 1.5 years ago presents with red, swollen, edematous right stump from ulceration which occurred approximately 3 weeks prior.

PMH: DM, Neuropathy, HTN, Hyperlipidemia

PSH: Right TMA, abcess I&D groin, left ankle I&D

Exam: Palpable popliteal and pedal pulses b/l. Ulcer right TMA stump at plantar lateral aspect with tracking, mal odor, and edema. No purulence, moderate erythema, and no maceration.

Labs:

- Glucose 483 mg/dL
- WBC 9.0 K/cu mm
- ESR=70 MM/HR
- CRP=4.93 mg/dL



MRI Report

Status post right foot transmetatarsal amputation. Diffuse cellulitis and myositis in the area of amputation with ulcer on the planter aspect at the fifth metatarsal level. Mild patchy abnormal signal in amputated distal fourth metatarsal, fifth metatarsal, mid second metatarsal and in cuboid suspicious for osteomyelitis. 2. Localized 1 cm fluid collection under the first metatarsal suspicious for small abscess. 3. No large foreign body identified however MRI is not very sensitive for small foreign bodies.



- Chopart Amputation with anterior tibial tendon transfer to the lateral dorsal aspect of the talar neck with a percutaneous Tendo-Achilles lengthening
- IV Vanco and Zosyn while inpatient. Clindamycin and Cipro PO on d/c home x 7 days.
- All infection removed with amputation. Clean margins from pathology.
- Length of stay 7 days
- Completely healed, sutures removed, and patient walking in CAM boot at 4 weeks. Fitting delayed due to new developed contralateral ankle wound on other extremity.
- Choparts completely healed and patient ambulating with no complaints. Contralateral ankle ulcer resolved in 6 weeks and patient expired 4 months later.



https://hersco.com/education-center/partial-foot-amputees

73 yo DM male with history of PVD admitted for acute soi of right foot with concerns for osteomyelitis of 5th metatarsal. He was diagnosed with DM in 2002 and underwent left BKA left in 2008. Prior to his admission, PVD led to auto-amputation of the right 5th digit which patient had originally denied any surgical intervention and was content with auto-amputation outcome. He was diagnosed with 5th metatarsal osteomyelitis and previously chose conservative care, which consisted of 3 weeks of Ceftriaxone and 3 weeks of augmentin. He now presents with further gangranous changes

PMH: DM, Neuropathy, HTN, Hyperlipidemia, Glaucoma

PSH: Left BKA

Vital signs stable

LE Exam: nonpalpable right DP, PT and popliteal artery. Femoral artery is palpable in right LE. Malodor to right foot with ulceration to bone at 5th metatarsal and darkening of skin with gangranous changes to 4th digit and forefoot. Macerated skin at forefoot and the 5th metatarsal of right foot.

Bone Biopsy/Histopathology and Cultures: Klebsiella oxytoca, Pseudomonas Aeruginosa, MRSA.

Zosyn IV and Vancomycin IV

WBC=12.8 K/uL HGB/HCT= 10.5g/dL/29.6 % Creatinine=1.94 mg/dL eGFR=41 ml/min BUN=36 mg/dL Glucose=372 Alk Phos=204 ESR= 111 mm/hr CRP=17.59 mg/dL

Xray Findings: The right little toe is absent from the level of the midportion of the fifth metatarsal. The remaining portion of the distal end of the right fifth metatarsal is irregular in contour and mineralization suggesting an active bony lesion, osteomyelitis. The distal end of the fourth metatarsal is intact, but its mineralization is patchy and irregular suggesting involvement with osteomyelitis as well. The proximal end of the middle phalanx of the fourth right toe also suggests osteomyelitis because of its patchy mineralization examination. The soft tissues in the lateral aspect of the right foot demonstrate gas which may be secondary to infection also.

Atherosclerotic calcification noted within some tissues also.



Abnormal Tc labeled WBC scan with evidence of osteomyelitis involving the distal fifth right metatarsal bone with a significant soft tissue component.





VASCULAR CONSULT:

Bilateral brachial pressures were noncompressible, which makes ankle brachial indexes not obtainable. Right PVR wave forms were obtained and visualized with a slight dicrotic notch. This is indicative of a normal wave form and no evidence of peripheral arterial disease throughout the right leg however, the right great to pressure is documented at only 41 mm\Hg.

Left thigh PVR was also documented with a wave form within normal limits.



Podiatry Intervention

Chopart Amputation with anterior tibial tendon transfer to the lateral dorsal aspect of the talar neck with a percutaneous Tendo-Achilles lengthening

Vascular Intervention 2 days later:

Preoperative Diagnosis: Right foot ischemic tissue loss

Postoperative Diagnosis: Same

Procedure: 1) Aortogram; 2) Right leg arteriogram with CO2 and contrast.

Anesthesia: Local / MAC

Findings: There were no significant stenoses to the level of the knee. Below the knee, the patient has severe tibial artery occlusive disease. The TP trunk, peroneal artery, and posterior tibial artery are occluded without significant reconstitution distally. The anterior tibial is patent which has tapering near the ankle with minimal filling of the pedal arch. This pattern of arterial occlusive disease cannot be remediated surgically or with endovascular approaches. We have nothing further to offer. The major of the arteriogram was performed with CO2 with onlyl 20 mL of iodinated contrast. The left CFA puncture site was closed



- Length of stay 16 days
- All infection removed with amputation. Clean margins from pathology, but patient still spiking with fevers. Once stable and soi resolved, ID plan of care d/c to facility with IV Vanc and Zoysn x 3 weeks followed by Minocycline 100mg bid and Augmentin 875mg bid x 3 weeks.
 - Intra Op bone cultures
 - E. faecalis and Klebsiella oxytoca
 - Intra Op tissue cultures
 - E. faecalis, Klebsiella oxytoca, Staph saccharolyticus
- Weekly CBC, CMP, ESR, CRP afterdischarge
- Incision site dehisced post operatively during outpatient follow up (see photo)

- OR Debridement
- NPWT





Advantages of the Chopart Amputation

- Salvage of bipedal stance ¹
- Preserves bilateral leg length equality ¹
- Maintains autonomous walking and transfers ¹
- Less psychological and physical disability than a BKA or AKA ¹

1. Faglia E et al. Outcomes of Chopart amputation in a tertiary referral diabetic foot clinic: Data from a consecutive series of 83 hospitalized patients. The Journal of Foot & Ankle Surgery 55 (2016) 230-234

Tips and pearls from my experience

- Chopart Amputation with anterior tibial tendon transfer to the lateral dorsal aspect of the talar neck with a percutaneous Achilles tendon lengthening. Tendon balancing is a must for success of this procedure
- Irrigate with antibiotic irrigation solution or pulse lavage after infected tissue and bone is removed.
- After resection of infected bone and tissue, it is preference to re-prep, redrape lower extremity and re-scrub. Have a 2nd set of clean instruments and clean table for the anterior tibial tendon transfer and Achilles tendon lengthening.



Thank You

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