CLI in ESRD. Upper and lower limb ischemia

Vincenzo Foppa, 1462
“The miracle of the salvaged foot”
Cappella Portinari, S. Eustorgio Church
Milan, Italy
Disclosure

Roberto Ferraresi, MD

In the last 2 years I have the following potential conflicts of interest to report:

**Consultant:** Medtronic, Abbott, Boston Scientific, Contract Medical International, Cook, Asahi, Ivascular, Biotronic, Limflow, Spectranetics, Shire, Kardia, Astra Zeneca, Orbus, Bard

**Virtual shareholder:** Limflow
1. Upper limb CLI in ESRD pts

2. Lower limb CLI in ESRD pts

3. Optimistic approach

4. Pessimistic approach

5. Realistic approach
32 hemodialysis centers
- 3885 ESRD pts
- 85% hemodialysis, 15% peritoneal

86 pts (2.1%) with Critical Hand Ischemia
- 49% Pain at rest
- 51% tissue lesion

47 (49%) omolateral functioning AVF
Mean time from beginning of dialytic treatment
9.2 ys ± 9.2 (SD)
A single center experience


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<tr>
<th>ESRD-HD</th>
<th>142 (76%)</th>
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<td>Other</td>
<td>44 (24%)</td>
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Images in Cardiovascular Medicine

Percutaneous Transluminal Angioplasty for Treatment of Critical Hand Ischemia

Roberto Ferraresi, MD; Marco Ferlini, MD; Fabiola Sozzi, MD, PhD; Guido Pomidossi, MD; Carlo Caravaggi, MD; Gian B. Danzi, MD

Angioplasty of Below-the-elbow Arteries in Critical Hand Ischaemia

R. Ferraresi a,*, A. Polloschi a, G. Aprigliano c, C. Caravaggi b, M. Centola a, F. Sozzi c, G.B. Danzi c, M. Manzi d

J Vasc Access 2012; 00 (00): 000-000
DOI: 10.5301/jva.5000098

First use of drug-eluting balloon for below-the-elbow artery occlusion in a hemodialysis patient: a 3-year follow-up

Original Article

Angiographic study of upper limb vascularization in a large cohort of hemodialysis patients with critical hand ischemia

Roberto FERRARESI 1,*, Jorge ACUÑA-VALERIO 2, Matteo FERRARIS 3, Marco FRESA 4, Meneme HAMADE 1, Gian B. DANZI 1, Roberto GANDINI 1, Giovanni MAURI 1,2

Review

Radiological anatomy of upper limb arteries and their anatomical variability: implications for endovascular treatment in critical hand ischemia

Giovanni MAURI 1,2, Marco FRESA 4, Matteo FERRARIS 3, Jorge ACUÑA-VALERIO 2, Meneme HAMADE 1, Gabriele DI LUCA 5, Gian Battista DANZI 1, Roberto FERRARESI 1,2

Review

Endovascular treatment of below-the-elbow arteries in critical hand ischemia

Roberto GANDINI 1, Sebastiano FABIANO 1, Daniele MOROSETTI 1, Stefano MEROLLA 1, Giovanni MAURI 2,3, Roberto FERRARESI 1,2
Ultraverse 0.014” 3.0 mm
• CHI is present in at least 2% of HD-pts

• In my opinion is an under-recognized & under-treated disease

• In our experience we applied the same endovascular techniques used in lower limb CLI pts
1. Upper limb CLI in ESRD pts
2. Lower limb CLI in ESRD pts
3. Optimistic approach
4. Pessimistic approach
5. Realistic approach
Peripheral Arterial Disease in Patients With End-Stage Renal Disease
Observations From the Dialysis Outcomes and Practice Patterns Study (DOPPS)

(Circulation. 2006;114:1914-1922.)

- 29,873 ESRD-HD patients
- 628 centers in USA, Europe, Japan, Canada, Australia/New Zealand
Critical limb ischaemia as a main cause of death in patients with end-stage renal disease: a single-centre study

Michael Koch¹, Rudolf Trapp¹, Wolfgang Kulas¹ and Bernd Grabensee²

¹Centre of Nephrology Mettmann and ²Department of Nephrology and Rheumatology, Heinrich Heine University, Düsseldorf, Germany

Conclusion

1. **The complications of CLI are among the main causes of death in ESRD patients; all patients who died of these causes were hospitalized and most of them needed morphine for pain.**

2. **These patients died due to infection, sepsis or multiorgan failure after being bedridden.**

- 322 ESRD-HD pts
- 5 yy follow up (1997-2003)
- End points: incidence of CLI & all-cause of death
• PAD is common in HD pts and is associated with increased risk of cardiovascular mortality, morbidity, hospitalization and reduced QOL

• CLI & ESRD are the markers of a poor prognosis, comparable with that of colon cancer
1. Upper limb CLI in ESRD pts
2. Lower limb CLI in ESRD pts
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PTA is feasible and effective in most CLI-HD pts, with a limb salvage rate similar to the highest reported in literature…

Although patient survival remains poor, the limb salvage rate after EVT is favorable among HD pts with CLI due to isolated BK disease

The long-term outcome after PTA may be fully acceptable in HD pts who are at the highest risk of CV disease
The incidences of all-cause death and major amputation seemed acceptable in HD-pts undergoing EVT for CLI.

...our limb salvage protocol ensures a good rate of limb salvage in HD-pts even if they have a higher risk of amputation and death compared to no-HD pts.

Limb salvage rate in HD pts diabetes justifies an aggressive policy of revascularization, despite decreased survival of this population.
According to some papers, technical success and limb salvage rate after revascularization (surgical or percutaneous) in CLI-HD pts is favorable.

Patients survival remains poor and their fragility seems to require dedicated protocols.
1. Upper limb CLI in ESRD pts
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Clinical outcome after infra-popliteal bypass surgery was poorer in CLI-HD pts compared with non-HD pts.

Survival and limb salvage rates after bypass surgery were significantly lower in the HD-pts than in the non-HD-pts, despite no significant difference in graft patency. CLI associated with ESRD has a poor prognosis.
Despite improvement in endovascular techniques..., the incidence of limb salvage among HD-pts remains poor, resulting in a high rate of major amputations.

HD-pts undergoing fem-pop endovascular interventions have a low cumulative patency and clinical efficacy.

The preferential use of endovascular-first approach is attractive in this vulnerable multimorbid group of patients, but the evidence for endovascular treatment is very scarce.
Clinical efficacy of BTK angioplasty is limited in pts with ESRD because of the severely diseased pedal arteries.

ESRD-pts yielded a more affected pedal arch, and were at approximately twice the risk of wound healing failure, reintervention, and death or major amputation than no-ESRD patients.

The inferior wound-healing and limb salvage rates observed in pts with renal failure bring to question the utility of infrapopliteal angioplasty in this population.
HD-pts who present with rest pain have equivalent short-term outcomes to no-HD pts but do not achieve long-term satisfactory clinical efficacy and AFS.

Amputation free survival rates after PTA in all HD-pts with tissue loss are <50% at 3 years, making their prognosis poor.

In comparison with non-HD pts, the clinical efficacy of infrapopliteal EVT for HD-pts was poor.
The majority of the Authors indicate that revascularization (surgical or percutaneous) in CLI-HD-pts has poor results due to:

- hard calcifications of distal vessels & severely diseased pedal arteries
- wound healing failure
- reinterventions
- poor limb salvage rate compared with no-HD pts
Our results indicate that an early amputation of a CLI would probably prevent death.
1. Upper limb CLI in ESRD pts

2. Lower limb CLI in ESRD pts

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5. Realistic approach
Patient 1

- 49 yy old male
- Type 1 DM → onset at 16 yy
- ESRD-HD in the last 6 yy
- Presentation: 2° toe gangrene
Patient 2

- 60 yy old female
- ESRD-HD in the last 41 yy (GN)
- Presentation: chronic dorsal ulcer
Causes of HD

- GN
- Type 1 DM
- Type 2 DM
- Other
- HBP

ESRD-HD

Conclusion
Every patient is different! Do not refuse a potentially limb salvage treatment on the basis of prejudice.
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The miracle of the salvaged foot

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