## PVSS8.

### Improved Hemodynamic Outcomes with Glycopyrrolate Over Atropine in Carotid Angioplasty and Stenting

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**Objectives:** Prophylactic administration of atropine and glycopyrrolate have been used to prevent bradycardia and hypotension associated with carotid angioplasty and stenting (CAS). This study compared the efficacy of glycopyrrolate to atropine in preventing CAS-induced hemodynamic instability and cardiac complications.

**Methods:** 86 patients undergoing CAS between 2005-2009 were evaluated. 51 of these patients received prophylactic atropine or glycopyrrolate administration prior to CAS. Primary endpoints were stroke, MI, postoperative bradycardia (HR <60 beats/min), and hypotension (systolic BP <90). Other outcomes were tachycardia (HR>100), hypertension (systolic BP>160), absolute pressure changes (pre- and postoperative systolic BP difference), arrhythmias, EKG/cardiac enzyme abnormalities, neurologic changes, and access site complications.

**Results:** Mean age was 72 ± 9 years ($p$ = ns). Baseline systolic BP and HR were equivalent in both groups ($p$ = ns; figure 1). Bradycardia and hypotension were significantly higher in atropine patients compared to glycopyrrolate patients. There was a trend towards reduced hypertension and pressure changes in the glycopyrrolate cohort compared to atropine. Additionally, cardiac events were found to be equivalent.

**Conclusions:** Prophylactic glycopyrrolate, compared with atropine, reduces hemodynamic instability during CAS, which may diminish cardiac effects. We recommend glycopyrrolate to prevent CAS-induced bradycardia and hypotension.

**Table 1.** Baseline and postoperative comparison between patients with glycopyrrolate and atropine prophylaxis

| | *Glycopyrrolate* | *Atropine* | *P value* |
|---|---|---|---|
| **Baseline parameters*** | | | |
| Systolic blood pressure (mmHg) | 137.63 ± 20.4 | 137.33 ± 17.1 | NS |
| Heart rate (beats/min) | 70.22 ± 10.6 | 64.42 ± 7.8 | NS |
| **Postoperative parameters*** | | | |
| *Hemodynamic* | | | |
| Bradycardia | 9/27 (33.3%) | 18/24 (75%) | 0.005 |
| Hypotension | 2/27 (7.4%) | 9/24 (37.5%) | 0.015 |
| Tachycardia | 1/27 (3.7%) | 7/24 (29.2%) | NS |
| Hypertension | 2/27 (7.4%) | 4/24 (16.7%) | NS |
| Systolic pressure change (mmHg) | 21.41 ± 18.4 | 26.08 ± 15.8 | NS |
| *Morbidity†* | | | |
| Cardiac | 3/27 (11.1%) | 5/24 (20.8%) | NS |

*NS*, not significant; *Continuous data presented as mean ± SD; †Cardiac: MI, arrhythmia, ischemic EKG changes, cardiac enzyme elevation

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## PVSS9.

### Geometric and Morphological Analyses of the Superficial Femoral Artery by IVUS

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**Objectives:** The purpose of this study was to characterize geometry and plaque composition of the superficial femoral artery (SFA) using intravascular ultrasound (IVUS).

**Methods:** Sequential, cardiac-gated IVUS imaging of a 10cm SFA segment was collected systole using a motorized pullback device (0.5mm/s), Eagle Eye catheter, and IVUS console (Volcano Corp) from patients (n = 59) undergoing angiography for evaluation/treatment of peripheral arterial disease (PAD). All imaging was performed prior to any intervention. IVUS data was analyzed using the corresponding post-processing software. Lumen and media-adventitia contours were manually identified which allowed vessel geometry and VH-IVUS plaque composition data to be extracted. Overall mean geometric and plaque composition values were calculated by averaging all cross sectional images over the length of each pullback. Minimum and maximum diameters represent extremes encountered from 11,763 analyzed IVUS images.

**Results:** See able 1. Over 70% of all SFA vessel diameters fall between 5mm and 7mm. The mean luminal and vessel cross sectional areas were 15.0 $mm^2$ and 30.9 $mm^2$ respectively yielding an overall mean area stenosis of 51.4% for the cohort. Plaque burden in SFA was 106.6 $mm^3$/cm.

**Conclusions:** IVUS imaging provided a wealth of geometric and morphologic data. This quantitative data may better define characteristics of the SFA in patients with PAD.

Table 1. Summary of SFA geometry and plaque composition

| | | *Min* | *Mean ± STDEV* | *Max* |
|---|---|---|---|---|
| Diameter | Lumen (mm) | 1.5 | 4.2 ± 0.9 | 7.5 |
| | Vessel (mm) | 2.2 | 6.2 ± 0.9 | 9.6 |
| Plaque | Area Stenosis (%) | 13.7 | 51.4 ± 10.7 | 90.7 |
| | Fibrous (%) | | 56.3 ± 14.7 | |
| | Fibro-Fatty (%) | | 10.8 ± 7.8 | |
| | Necrotic Core (%) | | 18.3 ± 9.7 | |
| | Dense Calcium (%) | | 14.6 ± 11.5 | |

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**PVSS10.**

**National Outcomes and Charges for Claudication and Limbthreat: Angioplasty Versus Bypass Graft**

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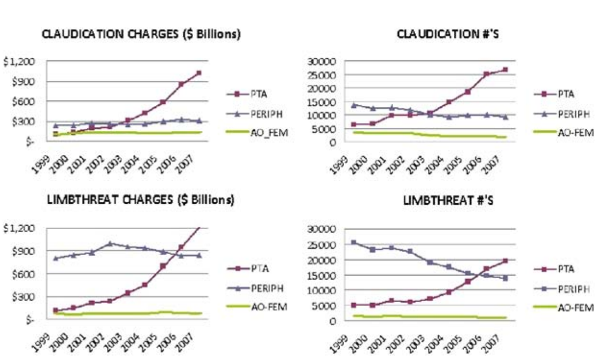
**Objectives:** Assess Outcomes & Costs in Patients with Lower Extremity Vascular Disease Undergoing Intervention.

**Methods:** We used the NIS database (1998-07), selecting those with atherosclerosis & intervention for claudication (CL) [ICD-9: 440.21] or limbthreat (LT) [440.22-24] with angioplasty +/− stent (PTA) [39.50, 39.90], aorto-femoral bypass (AFB) [39.25], & peripheral bypass (BPG) [39.29]. We evaluated demographics, comorbidities, charges & adjusted mortality & major amputation.

**Results:** There were 563, 142 patients: PTA: 218, 656 (38%), BPG: 280, 022 (50%), AFB: 36, 307 (6%). PTA patients were older than BPG (71 v 70y), more often female (46 v 42%), had similar but lower mortality than BPG for CL (.2 v .4%) and LT (2.1 v 2.5%). PTA had higher major amputation for LT (7% v 4%) [all $p < 0.01$]. Median LOS was lowest for PTA (CL:1d, LT:3d), followed by BPG (CL:3d, LT:6d) and AFB (CL:5d, LT:7d) [all $p < 0.01$]. Total procedures for CL rose 58% (24, 488 - 38, 785), while charges rose 228% ($0.46 - $1.5 billion). Procedures for LT rose 5% (34, 402 - 36, 147) while charges rose 112% ($1.1 to $2.3 billion) [Figure]. For CL and LT, PTA has surpassed BPG & AFB combined.

**Conclusions:** PTA has altered the treatment paradigm for lower limb ischemia with increased procedures & charges. It is unclear if this represents an increase in patients or number of treatments per patient. Although mortality is lower with PTA, limb loss appears higher, necessitating longitudinal studies to determine the appropriateness of PTA for these patients. The mortality benefit with PTA may be ultimately lost if multiple interventions are performed on the same patients.

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**PVSS11.**

**Management of Dialysis-Dependent Patients With Critical Limb Ischemia**

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**Objectives:** The goal of our study was to assess the current management strategies in dialysis-dependent patients with critical limb ischemia (CLI), and to identify parameters associated with limb loss in this patient population.

**Methods:** Dialysis-dependent patients who presented with CLI (Rutherford 4-6) between 06/2001-06/2009 were retrospectively analyzed.

**Results:** There were 94 patients (82% males, 119 limbs, mean age 67 ± 10). Co-morbidities included CAD (87%), hypertension (86%), DM (78%), non-ambulatory status (26%). Indications were rest pain (18%), non-healing ulcer (23%), gangrene (53%), and advanced foot sepsis (7%). Primary amputation (PA) was performed in 20%; 26% underwent open bypass, 54% had endovascular (EV) interventions. More EV-treated patients had gangrene than open group (63% vs 39%, $p = 0.047$). The most distal intervention was infrapopliteal in 47% of patients (open, 51%; endovascular, 62%, $p = 0.259$). Two-year survival was worse in PA group (21 ± 8%, vs 51 ± 9% in open, 41 ± 7% in EV, $p = 0.088$). Limb salvage (LS) was similar in open and EV groups (2-year LS 60 ± 9.7% vs 58 ± 8%, $p = 0.690$). Amputation-free survival (AFS) was also similar (2-year AFS 38 ± 9% in open vs 28 ± 6% in EV, $p = 0.304$). Multivariate analysis showed only non-ambulatory status (OR: 3.0, 95% CI, 1.4-6.8, $p = 0.007$) and gangrene (OR:2.7, 1.1-6.5, $p = 0.027$) being independently associated with limb loss after limb salvage attempt. The LS rate was 0% at 6 months in non-ambulatory patients with gangrene (n = 15), whereas it was 70 ± 8% in ambulatory patients with gangrene (n = 37). Only 6 of the 15 non-ambulatory patients with gangrene who had LS attempt did not have an amputation; all died within 3 months with non-healed wounds.

**Conclusions:** EV interventions play a significant role in the current management of dialysis-dependent patients with CLI, with similar results to open reconstructions. Non-ambulatory dialysis patients with gangrene carry a dismal prognosis and primary amputation should be considered as the initial modality.

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