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### **TCT-170 Development and Validation of a Scoring System for Predicting Clinical Coronary Artery Perforation During Percutaneous Coronary Interventions of Chronic Total Occlusions: The PROGRESS-CTO Perforation Score**

Spyridon Kostantinis

Bahadir Simsek

Judit Karacsonyi

Khaldoon Alaswad

Farouc Jaffer

*See next page for additional authors*

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**Authors**

Spyridon Kostantinis, Bahadir Simsek, Judit Karacsonyi, Khaldoon Alaswad, Farouc Jaffer, Jaikirshan Khatri, James Choi, Wissam Jaber, Stephane Rinfret, William Nicholson, Mitul Patel, Ehtisham Mahmud, Catalin Toma, Rhian Davies, Jimmy Kerrigan, Elias Haddad, Sevket Gorgulu, Ahmed ElGuindy, Omer Goktekin, Salman Allana, M. Nicholas Burke, Olga Mastrodemos, Bavana Rangan, and Emmanouil Brilakis

## PCI COMPLICATIONS

Abstract nos: 169-175

### TCT-169

#### Poly Vinyl Alcohol Particles for Coronary Artery Perforation: A Single Center Experience

Sameer Gupta,<sup>1</sup> Akanksha Pal<sup>2</sup>

<sup>1</sup>Metro Hospital and Heart Institute, Noida, India; <sup>2</sup>Department of Cardiac Research, Metro Hospital and Heart Institute, Noida, India



**BACKGROUND** Perforation of the coronary artery during percutaneous intervention is a feared complication, as it may cause cardiac tamponade, increasing morbidity and mortality. Some methods used to treat distal coronary artery perforations are prolonged balloon inflation and embolization with fat particles or coils. There are few published cases of using polyvinyl alcohol (PVA) particles to treat perforation. We report our single-center experience of 8 cases of the use of PVA particles for the treatment of distal coronary artery perforation.

**METHODS** We present a single-center experience at Metro Hospital and Heart Institute in Noida, India. From June 2016 to May 2022, 11,540 percutaneous interventions were performed. Distal coronary artery perforation was noted in 8 patients. The indications for the procedure were stable angina in 2 patients, unstable angina in 2 patients, non-ST-segment elevation acute coronary syndromes in 3 patients, and ST-segment elevation myocardial infarction in 1 patient.

**RESULTS** Perforation was noted in the left anterior descending coronary artery in 2 patients, in the right coronary artery in 1 patient, in the diagonal branch in 1 patient, and in the left circumflex coronary artery and obtuse marginal branch in 1 patient. This was caused by the coronary wire in all cases. Prolonged balloon inflation was performed, which did not seal the perforation. A 0.018-inch microcatheter was advanced into the distal artery, and PVA particles were infused (in a mixture of 50% saline and 50% contrast). This led to the successful closure of the perforations in all 8 patients. Percutaneous coronary intervention was completed successfully, and no complications were noted. Two patients developed tamponade prior to closure requiring pericardiocentesis. Serial echocardiography after PVA infusion did not show an increase in effusion. Two patients reported mild chest pain that was diagnosed as pericarditis and resolved at follow-up. All patients were discharged with no change in ejection fraction at the time of discharge.

**CONCLUSIONS** Our case series demonstrated that embolization by PVA particles is a safe option for treating distal coronary artery perforations and was successful in all our patients. We conclude that occluding a distal coronary vessel perforation with PVA particles is safe, effective, and simple. This should be an important addition to the list of available alternatives.

**CATEGORIES CORONARY:** Complex and Higher Risk Procedures for Indicated Patients (CHIP)

### TCT-170

#### Development and Validation of a Scoring System for Predicting Clinical Coronary Artery Perforation During Percutaneous Coronary Interventions of Chronic Total Occlusions: The PROGRESS-CTO Perforation Score

Spyridon Kostantinis,<sup>1</sup> Bahadır Simsek,<sup>1</sup> Judit Karacsonyi,<sup>2</sup> Khaldoon Alaswad,<sup>3</sup> Farouc Jaffer,<sup>4</sup> Jaikirshan Khatri,<sup>5</sup> James Choi,<sup>6</sup> Wissam Jaber,<sup>7</sup> Stephane Rinfret,<sup>8</sup> William Nicholson,<sup>9</sup> Mitul Patel,<sup>10</sup> Ehtisham Mahmud,<sup>11</sup> Catalin Toma,<sup>12</sup> Rhian Davies,<sup>13</sup> Jimmy Kerrigan,<sup>14</sup> Elias Haddad,<sup>14</sup> Sevket Gorgulu,<sup>15</sup> Ahmed ElGuindy,<sup>16</sup> Omer Goktekin,<sup>17</sup> Salman Allana,<sup>18</sup> M. Nicholas Burke,<sup>19</sup> Olga Mastrodemos,<sup>1</sup> Bavana Rangan,<sup>1</sup> Emmanouil Brilakis<sup>2</sup>

<sup>1</sup>Minneapolis Heart Institute Foundation, Minneapolis, Minnesota, USA; <sup>2</sup>Minneapolis Heart Institute, Minneapolis, Minnesota, USA; <sup>3</sup>Henry Ford Hospital, Detroit, Michigan, USA; <sup>4</sup>Massachusetts General Hospital, Boston, Massachusetts, USA; <sup>5</sup>Cleveland Clinic, Cleveland, Ohio, USA; <sup>6</sup>Baylor University Medical Center, Dallas, Texas, USA; <sup>7</sup>Emory University School of Medicine, Atlanta, Georgia, USA; <sup>8</sup>Emory University, Atlanta, Georgia, USA; <sup>9</sup>Emory Healthcare, Fisher, Minnesota, USA; <sup>10</sup>University of California, San Diego, Health System, La Jolla, California, USA; <sup>11</sup>University of California, San Diego, School of Medicine, La Jolla, California, USA; <sup>12</sup>University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania, USA; <sup>13</sup>Wellspring York Hospital, York, Pennsylvania, USA; <sup>14</sup>Ascension Saint Thomas Heart, Nashville,

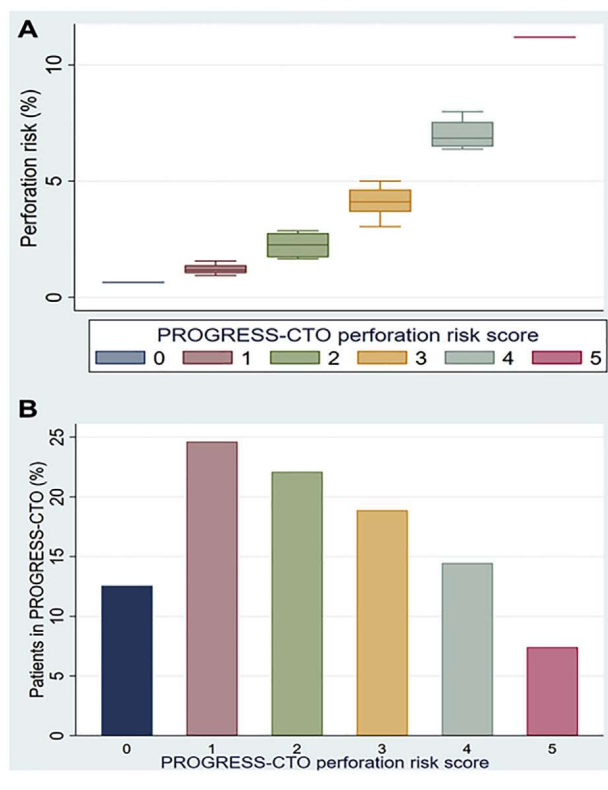
Tennessee, USA; <sup>15</sup>Acibadem University, Istanbul, Turkey; <sup>16</sup>Magdi Yacoub Heart Foundation, Cairo, Egypt; <sup>17</sup>Memorial Bahcelievler Hospital, Istanbul, Turkey; <sup>18</sup>Minneapolis Heart Institute, Edina, Minnesota, USA; <sup>19</sup>Minneapolis Heart Institute, Abbott Northwestern Hospital, Minneapolis, Minnesota, USA

**BACKGROUND** Coronary artery perforation is a feared complication of chronic total occlusion (CTO) percutaneous coronary intervention (PCI) and often leads to serious adverse clinical events.

**METHODS** We analyzed clinical and angiographic parameters from 9,618 CTO PCIs in the PROGRESS-CTO (Prospective Global Registry for the Study of Chronic Total Occlusion Intervention). Logistic regression prediction modeling was used to identify independently associated variables, and models were internally validated with bootstrapping. Clinical coronary artery perforation was defined as any perforation requiring treatment.

**RESULTS** The incidence of clinical coronary perforation was 3.8% (n = 367). Five factors were independently associated with perforation and were included in the score: patient age  $\geq 65$  years, +1 point (OR: 1.79; 95% CI: 1.37-2.33); moderate or severe calcification, +1 point (OR: 1.85; 95% CI: 1.41-2.42); blunt or no stump, +1 point (OR: 1.45; 95% CI: 1.10-1.92); use of antegrade dissection and re-entry strategy, +1 point (OR: 2.43; 95% CI: 1.61-3.69); and use of the retrograde approach, +2 points (OR: 4.02; 95% CI: 2.95-5.46). The resulting score showed acceptable performance on receiver-operating characteristic curve (area under the curve: 0.741; 95% CI: 0.712-0.773). The Hosmer-Lemeshow test indicated good fitness ( $P = 0.991$ ), and internal validation with bootstrapping demonstrated a good agreement with the model (observed area under the curve: 0.736; 95% bias-corrected CI: 0.706-0.767).

Figure. Panel A: PROGRESS-CTO perforation risk score and corresponding risk percentage; Panel B: Proportion of patients within each perforation risk group.



**CONCLUSIONS** The PROGRESS-CTO perforation score is a useful tool for prediction of clinical coronary perforation in CTO PCI.

**CATEGORIES CORONARY:** Complex and Higher Risk Procedures for Indicated Patients (CHIP)