

Radial vs. Femoral Artery Access in Elderly Patients Undergoing Percutaneous Coronary Intervention

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ABSTRACT

Background: Studies demonstrate that radial artery access reduces the risk of vascular and bleeding complications associated to percutaneous coronary intervention. Our objective was to evaluate in-hospital results of the transradial approach in elderly patients undergoing percutaneous coronary intervention.

Methods: Prospective registry including patient's ≥ 70 years of age; safety and efficacy endpoints were compared for the radial and femoral artery access groups. **Results:** We included 255 patients, 117 (52%) treated using the radial approach and 108 using the femoral approach. Except for age, the remaining clinical characteristics did not show differences between groups. Male patients prevailed (60%), 36.7% were diabetic and over one third were diagnosed with acute coronary syndrome. Angiographic and procedure-related variables did not show differences between groups. When vascular complication rates were compared only hematomas < 5 cm (5.1% vs. 17.6%; $p < 0.01$) were more prevalent with the femoral access. Major bleedings, according to the ACUITY criteria (zero vs. 5.6%; $p = 0.01$) and minor bleedings, according to the TIMI criteria (zero vs. 7.4%; $p < 0.01$), were also more frequent in the femoral group. In-hospital clinical endpoints, death (0.9% vs. 5.6%; $p = 0.06$) and non-fatal infarction (zero vs. 3.7%; $p = 0.05$) were more frequent in patients treated by the femoral access. **Conclusions:** In a non-selected patient population ≥ 70 years of age, percutaneous coronary intervention by radial access was associated to a lower incidence of in-hospital clinical endpoints, especially of bleeding events related to the vascular access route.

DESCRIPTORS: Femoral artery. Radial artery. Percutaneous coronary intervention. Aged.

RESUMO

Acesso Radial vs. Acesso Femoral em Pacientes com Idade Avançada Submetidos à Intervenção Coronária Percutânea

Introdução: Estudos demonstram que o acesso via artéria radial diminui o risco de complicações vasculares e hemorrágicas associadas à intervenção coronária percutânea. Nosso objetivo foi avaliar os resultados hospitalares da utilização da via radial em pacientes idosos submetidos à intervenção coronária percutânea. **Métodos:** Registro prospectivo, que incluiu pacientes ≥ 70 anos, tendo sido comparados os desfechos de segurança e de eficácia entre os grupos tratados pelas vias radial e femoral. **Resultados:** Incluímos 225 pacientes, sendo 117 (52%) tratados por via radial e 108 por via femoral. À exceção da idade, as demais características clínicas não mostraram diferenças entre os grupos. Predominaram os pacientes do sexo masculino (60%); 36,7% eram diabéticos e mais de um terço foi tratado na vigência de quadro de síndrome coronária aguda. As variáveis angiográficas e do procedimento não mostraram diferenças entre os grupos. Na comparação das taxas de complicações vasculares, somente os hematomas < 5 cm (5,1% vs. 17,6%; $p < 0,01$) foram mais prevalentes no acesso femoral. Sangramentos maiores, pelo critério ACUITY (zero vs. 5,6%; $p = 0,01$), e menores, pelo critério TIMI (zero vs. 7,4%; $p < 0,01$), também foram mais frequentes no grupo femoral. Os desfechos clínicos hospitalares óbito (0,9% vs. 5,6%; $p = 0,06$) e infarto não fatal (zero vs. 3,7%; $p = 0,05$) incidiram mais frequentemente nos pacientes tratados por via femoral. **Conclusões:** Em uma população não selecionada de pacientes com idade ≥ 70 anos, a intervenção coronária percutânea por via radial esteve associada à menor incidência de desfechos clínicos hospitalares, em especial de eventos hemorrágicos relacionados à via de acesso vascular.

DESCRIPTORES: Artéria femoral. Artéria radial. Intervenção coronária percutânea. Idoso.

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The femoral approach has remained, for more than two decades, as the main access route in percutaneous coronary intervention (PCI). Recent studies show that the choice of radial access is associated with considerable reduction in the risk of vascular and bleeding complications.¹⁻³ Nevertheless, the radial technique still represents less than 10% of the approaches used in PCI worldwide, which can be explained by the demand for greater skill of the interventionist and for a longer learning curve.¹ These facts are related to the characteristics of the vessel (of smaller caliber than the femoral artery), the anatomic variations, and the potential to cause arterial spasm.⁴

Although increasingly potent antithrombotic and antiplatelet drugs have reduced ischemic events related to PCI, the increase of bleeding complications associated with the procedure can lead to increased morbimortality.^{1,4,5} In this scenario, no strategy has caused greater impact than the use of the radial artery rather than femoral access in the reduction of bleeding events related to PCI.⁶

Among the independent predictors of bleeding related to PCI, older age has been demonstrated as an independent risk factor in several studies.^{7,8} This fact should lead to greater use of the radial approach in this population; however, due to the greater degree of atherosclerosis, calcification, and tortuosity of small- and medium-caliber vessels in this age group, PCI by radial approach can lead to higher failure rate, prolonged procedure, use of a greater amount of contrast, and greater exposure to radiation.⁹

The present study aimed to compare the clinical in-hospital outcome of transradial access use when compared with the femoral approach in patients aged ≥ 70 years submitted to PCI.

METHODS

Population

This study included consecutive patients aged ≥ 70 years undergoing PCI in two high-volume hospital services in Curitiba (PR) from January 2012 to November 2013. Clinical and epidemiological data, as well as in-hospital clinical events, were collected and stored in the database, comparing the outcomes of safety and efficacy of the cohort submitted to PCI by radial approach vs. femoral access. The interventionists performing the procedures were skilled in both techniques.

At least 24 hours pre-PCI, patients treated electively received acetylsalicylic acid (loading dose of 300 mg and maintenance dose of 100 mg/day) and clopidogrel (loading dose of 300 mg and maintenance dose of 75 mg/day). Urgency or emergency cases, without enough time for the pre-treatment, received a loading

dose of clopidogrel of 600 mg or ticagrelor (loading dose of 180 mg and maintenance dose of 90 mg every 12 hours). All patients were instructed to maintain the dual antiplatelet therapy for at least one month in the case of bare-metal stent implantation, and for one year, if drug-eluting stents were used.

The stent implantation technique, the vascular access route, stent type, and the medications used during the procedure were chosen at the discretion of the interventionist.

Definitions

Regarding efficacy endpoints, combined cardiovascular and cerebrovascular events (ECCAM), death, stroke, acute myocardial infarction (AMI), and target vessel revascularization (TVR) were evaluated, as well as the rates of these isolated events. Death was defined as death from any cause that occurred during hospitalization. Periprocedural AMI was defined as the presence of new Q-waves in two or more contiguous leads, or as elevation of creatine kinase MB isoenzyme (CK-MB) at least three times higher than the normal upper level. In cases of AMI, the 20% increase in CK-MB in comparison to previous levels was considered a diagnostic of reinfarction.

Regarding safety outcomes, vascular and bleeding complications were evaluated according to the Thrombolysis in Myocardial Infarction (TIMI)¹⁰ and ACUITY¹¹ criteria. According to ACUITY, bleeding events were considered major (intracranial hemorrhage, intraocular hemorrhage, hematoma ≥ 5 cm in diameter, bleeding at the puncture site requiring intervention, any apparent bleeding with decrease in hemoglobin ≥ 3 mg/dL, decrease in hemoglobin ≥ 4 mg/dL without apparent site of bleeding, or need for transfusion) or minor (any bleeding which did not fit the above definition). According to the TIMI criteria, bleeding was considered as major (intracranial hemorrhage, clinically significant bleeding associated with a decrease in hemoglobin > 5 g/dL, or fatal bleeding), minor (any clinical signs of bleeding associated with the decrease in hemoglobin of 3 g/dL to 5 g/dL), or minimal (any clinical signs of bleeding associated with a decrease in hemoglobin < 3 g/dL).

STATISTICAL ANALYSIS

Continuous variables were described as means \pm standard deviations and compared by Student's *t*-test for independent variables or the Mann-Whitney test, according to their distribution. Categorical variables were presented as percentages and compared using the chi-squared test or Fisher's exact test, when appropriate. The effect of the access route on vascular and bleeding complications was determined using a multivariate logistic regression model, adjusted for variables with $p < 0.05$ as determined by the univariate analysis. The

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