

Percutaneous Coronary Intervention Using the Radial and Femoral Approaches: Comparison between Procedure-Related Discomforts and Costs

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ABSTRACT

Background: There are few studies on quality of life and costs after percutaneous coronary intervention (PCI) using different vascular accesses. We have compared procedure-related discomforts and costs of PCI using the radial or femoral approaches during hospital stay. **Methods:** Prospective, single center registry, including patients undergoing elective PCI. Procedure-related complaints were assessed at the end of bed rest using a specific questionnaire. Costs per unit of all the materials used in PCI were taken into account. **Results:** Patients treated by the radial approach were younger, male, and stable angina was the most common clinical presentation in both groups. Procedural duration, number of vessels treated and stents per patient were similar in both groups. There were no major vascular complications after PCI. We observed greater overall discomfort associated with the procedure (60.3% vs. 81.0%; $P = 0.01$), back pain (1.7% vs. 17.2%; $P < 0.01$), difficult urination (1.7% vs. 12.1%; $P = 0.03$) and patient's dependence to carry on basic activities (70.7% vs. 98.3%; $P < 0.01$) during the post-procedural observation period in the femoral group. No significant differences were observed between groups when costs were compared, with or without taking into account stent-related costs. **Conclusions:** PCI using the radial approach demonstrated to provide greater comfort for patients when compared to the femoral approach during hospitalization. Costs of the procedure using the two accesses were similar.

DESCRIPTORS: Percutaneous coronary intervention. Radial artery. Femoral artery. Quality of life.

RESUMO

Intervenção Coronária Percutânea Pelas Vias Radial e Femoral: Comparação Entre Desconfortos Relacionados ao Procedimento e Custos

Introdução: Escassos são os estudos a respeito da Qualidade de Vida pós-intervenção coronária percutânea (ICP), pelas vias radial e femoral, e dos gastos comparando as duas vias de acesso. Comparamos os desconfortos relacionados ao procedimento e os custos da ICP pelos acessos radial e femoral na fase hospitalar. **Métodos:** Registro prospectivo, unicêntrico, que incluiu pacientes submetidos à ICP eletiva. As queixas relacionadas ao procedimento foram avaliadas ao final do período de repouso no leito, por meio de um questionário específico. Foram computados os custos por unidade de todo o material utilizado na ICP. **Resultados:** Os pacientes tratados por via radial eram mais jovens, do sexo masculino e a angina estável foi o quadro clínico mais frequentemente tratado nos dois grupos. O tempo de exame, o número de vasos tratados e stents por paciente foram semelhantes entre os grupos. Não ocorreram complicações vasculares maiores após a ICP. Observamos maior desconforto geral associado ao procedimento (60,3% vs. 81,0%; $P = 0,01$), dor nas costas (1,7% vs. 17,2%; $P < 0,01$), dificuldade para urinar (1,7% vs. 12,1%; $P = 0,03$) e dependência do paciente para desempenhar atividades básicas (70,7% vs. 98,3%; $P < 0,01$) durante o período de observação no grupo femoral. Na comparação dos gastos, não foram notadas diferenças significantes entre os grupos, com ou sem a inclusão dos custos dos stents. **Conclusões:** A ICP por via radial demonstrou trazer maior conforto para o paciente comparada à via femoral, durante a fase hospitalar. Os custos dos procedimentos pelas duas vias de acesso foram semelhantes.

DESCRIPTORIOS: Intervenção coronária percutânea. Artéria radial. Artéria femoral. Qualidade de vida.

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Percutaneous coronary intervention (PCI) via transradial approach was introduced nearly 20 years ago;¹ since then, randomized studies have shown results that are superior to those of the femoral approach in terms of vascular complications and the occurrence of severe bleeding.^{2,3} Additionally, the radial technique has shown to be superior regarding patient quality of life (QoL) in the post-procedural period and immediately after discharge, with greater patient mobility and fewer complaints.⁴

In Brazil, the use of the transradial approach when performing PCI has progressively increased.^{5,6} However, there have been few studies on the discomforts associated with the procedure and costs when comparing the two access routes.^{4,7,8} Cost management is an important tool to control medical institution resources, either public or private.⁹

The present study aimed to compare the discomforts associated with the procedure and costs of PCIs by radial and femoral access during hospital stay.

METHODS

This was a prospective single-center registry, which included patients with coronary artery disease (stable angina or acute coronary syndrome without ST-segment elevation), successfully submitted to PCI by radial or femoral approach from August 2012 to May 2013. Procedures were performed according to current guideline recommendations.¹⁰

The inclusion criteria were patients older than 18 years, of both genders, submitted to elective PCI by radial or femoral approach. Patients undergoing primary PCI and those who had adverse cardiovascular events during procedures (cardiopulmonary arrest, acute myocardial infarction, acute pulmonary edema, and cardiogenic shock) were excluded.

The study was performed at the Laboratory of Interventional Cardiology and Adult Ward II of the Instituto Dante Pazzanese de Cardiologia, after being approved by the institution's Research Ethics Committee. Data were collected on patients scheduled for undergoing elective PCI, after examination for hospital admission and definition of puncture technique by the interventional physician in charge of the procedure. The patient was asked to participate in the study and, upon acceptance, signed the informed consent.

Review of complaints related to the procedure

Complaints related to the procedure were evaluated in all patients at the end of the bed rest period through a questionnaire, which included questions assessing general discomfort after the intervention, pain during puncture, discomfort in the limb used for the

access route, back pain, and difficulty urinating. The questionnaires were administered by a single investigator (MHA), after providing standardized instructions.

Procedures

The transradial puncture was performed using the Seldinger technique, 1 cm proximal to the styloid process of the radius, using a 6F Glidesheath sheath (Terumo Medical – Tokyo, Japan). Sedation was performed with a decimal solution of diazepam. Heparin was administered at a dose of 5,000 IU through the sheath and supplemented to reach 70 IU/kg to 100 IU/kg. Immediately after the procedure, the radial sheath was removed and hemostasis was performed with a TR Band device (Terumo Medical, Tokyo, Japan).

The transfemoral artery puncture was performed using the standard Judkins technique, using 6F sheaths. Heparin was administered at a dose of 5,000 IU through the sheath and supplemented to reach 70 IU/kg to 100 IU/kg. The femoral sheath was removed approximately two hours after the procedure, and homeostasis was performed by manual compression.

Costs

Costs were calculated per unit for all the material used during patient follow-up period: needles (40 × 12 mm or 30 × 7 mm), surgical apron, surgical drape, fenestrated field (small and large), operative field, balloon catheters, intravascular ultrasound catheters, diagnostic catheters, guide-catheters, alcoholic chlorhexidine solution (volume in mL), disposable electrode, contrast medium administration equipment, saline solution equipment, equipment extension (50 or 120 cm), surgical tape, injector pump extension, cerebral protection filter, 0.35-inch hydrophilic guide wire, contrast medium (Hexabrix® or Telebrix®), guidewire (0.14 or 0.35 inch), Gelco (20 or 22), femoral sheath, radial sheath, scalpel blade, manometer, medications in ampoules (adenosine, distilled water, atropine, diazepam, dipyrone, ephedrine, furosemide, glucose, metoclopramide, morphine, nitroglycerine, promethazine, protamine, and saline solution), medication in tablets/capsules (beta-blockers, angiotensin II receptor blockers, clonidine, hydralazine, angiotensin-converting enzyme inhibitor, and nitrate), medication in bottles (abciximab, heparin, hydrocortisone, lidocaine, sodium nitroprusside, and saline solution), set of metallic accessory surgical instruments (surgical tray, kidney tray, cover lid, round bowl, and tweezers), package of gauze with 20 units, pair of gloves, acrylic radioprotection protective device, control panel protection, radial compression device, syringes (1, 5, 10, or 20 mL), the stent (drug-eluting or bare-metal), five-way tap, tap for saline solution, pressure transducer, and saline solution transfer connector.

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