Editorial

Identifying patients at risk of vascular access complications

Identificação de pacientes com risco de complicações do acesso vascular

Routine coronary angiography and revascularization in patients with non-ST-segment elevation acute coronary syndromes (NSTEACS) have been shown to be of benefit.[1,2] However, these patients are at an increased risk of bleeding due to antiplatelet drugs, anticoagulants and invasive procedures. Major bleeding in patients with NSTEACS has been associated with increased risk of mortality.[3-5]

Vascular access site complications remain a common source of major bleeding, and radial access use was associated with a substantial reduction in the risk of vascular site bleeding.[6] The MATRIX trial (Minimizing Adverse haemorrhagic events by TRansradial access site and systemic Implementation of angioX) showed that radial compared to femoral access in patients with acute coronary syndrome reduced major bleeding and mortality.[7] These results have led major society guidelines to recommend radial over femoral in NSTEACS as primary approach in centers with radial expertise.[8]

Femoral vascular closure devices (VCD) were developed to achieve immediate hemostasis in patients undergoing coronary angiography or percutaneous coronary intervention (PCI). The CLOSURE trial randomized 3,015 patients to closure device versus manual compression and showed a significant reduction in vascular access complications with closure devices.[9] The reduction in vascular complications was driven by a reduction in large hematomas.

This is generating a gradual shift in the NSTEACS population undergoing PCI, from a majority of patients undergoing femoral approach with later external compression to a population undergoing radial or femoral access with VCD use. Identification of patients at risk of access-related vascular complications is vital for its prevention, and the evolution in access site selection and hemostasis management probably modifies risk factors of access-site related complications.

Andrade et al. presented a subanalysis of the ARISE (AngioSeal versus the Radial approach In acute coronary SyndromE) study in order to sort out the risk factors of access-site related complications in patients submitted to coronary angiography or PCI from radial or femoral approach using VCD.[10] The ARISE study was a single center randomized non-inferiority trial comparing radial versus femoral approach using VCD in patients with NSTEACS.[11] Authors performed overall and access site stratified analysis for vascular access-related complications, including hematoma ≥ 5 cm, severe bleeding, pseudoaneurysm, retroperitoneal hemorrhage, arterial occlusion, adjacent nerve damage, limb ischemia, compartment syndrome, arteriovenous fistula, infection, or need for vascular repair surgery. The rate of vascular complications after 30 days was 13.3% in the radial group and 12.5% in the femoral group, without significant difference. In univariate analysis, authors reported that body mass index (BMI), previous stroke, longer duration of the procedure, and VCD failure were related associated with access complications. Multivariable analysis showed that BMI and VCD failure were independently associated with access site complications. Authors also reported that female gender and high or very high-risk CRUSADE patients were associated with increased risk of vascular complications in the femoral group.

The first point to highlight from this analysis is the combination of asymptomatic radial occlusion and bleeding complications. Predictors of radial occlusion are not likely the same as risk factors for femoral access site bleeding. Anticoagulation may reduce radial occlusion but increase the rate of bleeding.

The relatively small sample size, combined with center volume and expertise, also was probably not enough to capture other more infrequent but clinically important complications, since there were no cases of arteriovenous fistula, retroperitoneal hematoma, compartment syndrome, limb ischemia, nerve damage, or need for vascular repair surgery. Sample size also limits the power for detecting subgroup interactions and multivariable analysis. As a consequence, larger and multisite studies may be required to better elucidate better the risk factors for vascular complications.

Authors report an independent increased risk of vascular-related complications among patients with high BMI. Although this interpretation is based on the overall cohort, this trend was more marked in the femoral (odds ratio – OR, 1.16; $p = 0.03$) compared to the radial access group (OR = 1.05; $p = 0.39$). Obese patients probably have a delay in recognition of access site bleedings, leading to the development of larger hematomas. This is consistent with a previous analysis, in which obese patients were associated with larger groin bleedings when compared to overweight patients.[12]

Failure of VCD was also independently associated with the risk of vascular access-related complications. When VCD failure occurs, although infrequent, manual compression is performed in a non-conventional setting (usually starting in the catheterization laboratory table), requiring pharmacologic anticoagulation reversal, which can be incomplete. Furthermore, patients with VCD closure usually have peripheral vascular disease, which also is related with increased risk of vascular complications. These factors altogether probably contribute to the increased risk of vascular complications (OR, 17) observed in patients with VCD failure. These results are compatible with larger cohort studies.[13]

Increased understanding as to the etiology of VCD failure is needed in order to prevent it and potentially prevent vascular complications. Based on the totality of the data, radial access is the best method for preventing vascular complications during PCI. If femoral access is required, VCD should be deployed by skilled operators, as a failure of the device can increase complications.

Conflicts of interest

The authors declare no conflicts of interest.

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