In Vivo Histological Assessment of a Spontaneous Coronary Artery Dissection

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A 63-year-old woman underwent urgent coronary angiography after failed fibrinolysis for an inferior ST-segment elevation acute myocardial infarction. The occlusion of the obtuse marginal branch (Thrombolysis in Myocardial Infarction flow 0 to 1) was observed (Figure 1A). The aspiration with the Diver CE catheter (Invatec, Italy) resulted in a huge amount of a soft, tubular tissue (Figure 2) with eventual complete flow restoration (Thrombolysis in Myocardial Infarction flow 3) (Figure 1B). The intravascular ultrasound (iLab System, Boston Scientific, Minneapolis, Minn) revealed the presence of the intimal flap in the proximal segment of the obtuse marginal branch. The false lumen was almost completely filled by thrombus (Figure 3). The thin strut cobalt-chromium Carbofilm-coated Chrono stent (3.0×2.5 mm; CID, Italy) was therefore implanted in the proximal segment of the obtuse marginal branch. The final angiography showed Thrombolysis in Myocardial Infarction flow 3 and persistent non-flow-limiting dissection in the distal segment of the target vessel (Figure 1C). The tissue was processed for histological analysis; light microscopy of hematoxylin-eosin–stained paraffin-embedded sections showed a dissection occurring between the inner two thirds and outer one third of the media, loss of muscle cells, and deposition of basophilic mucoid-like material (Figure 4). Neither granulocytic nor eosinophilic infiltrates were observed. Elastic fiber and collagen fragmentation was evident on Sirius red and reticulin histochemical staining, respectively, and featured the typical pattern of cystic medial necrosis. An angiographic follow-up performed at 6 months revealed good patency of the target vessel (Figure 1D).

To the best of our knowledge, the present case is the first in vivo assessment of the histology of a spontaneous coronary artery dissection. The prevalence of spontaneous coronary artery dissection is between 0.1% and 0.2% among those who...
undergo coronary angiographies, although it has been suggested that it may be underestimated because of a large number of cases leading to sudden cardiac death. Indeed, sudden cardiac death is the usual mode of presentation in ≈75% of patients.¹

The pathogenesis of spontaneous coronary artery dissection has not been clarified. Spontaneous coronary artery dissection is more frequent in women, with one third of cases occurring during pregnancy or in the postpartum period. Cystic medial necrosis of the coronary arteries is a rare finding, but it has been reported to cause spontaneous coronary dissection.² Cystic medial necrosis involves focal fragmentation of elastic fibers and loss of smooth muscle cells of the media (producing holes or “cysts”) associated with deposits of acid mucopolysaccharides. Conditions associated with cystic medial necrosis include the normal aging process, systemic hypertension, and Marfan syndrome.

Optimal treatment of spontaneous coronary artery dissection has not been defined. Spontaneous coronary dissection causing flow impairment or persistent ischemia should be considered for treatment by percutaneous coronary intervention or coronary artery bypass grafting.³ Percutaneous coronary intervention with stent implantation can restore the coronary flow, but there is the risk of stent implantation in the false lumen. Intravascular ultrasound guidance should be used to identify the false lumen and ensure correct stent implantation.⁴
Disclosures

None.

References


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