AngioSculpt PTCA Balloon
Entrapment During Dilatation of a Heavily Calcified Lesion

To the Editor:

The AngioSculpt PTCA balloon catheter (Angioscore, Inc.) consists of a semirigid balloon surrounded by nitinol spirals, the purpose of which is to dilate and rupture complex atherosclerotic plaques, minimizing slippage of the balloon, as in cases of restenotic, ostial, fibrocalcific, or other types of lesions. We describe the entrapment of an AngioSculpt PTCA balloon catheter during the predilatation of a heavily calcified lesion, analyzing the possible causal mechanism.

The patient was a 60-year-old man with a history of hypertension, diabetes mellitus and end-stage renal disease requiring chronic dialysis. He was admitted due to unstable angina, with anterior electrocardiographic changes and heart failure. His left ventricular ejection fraction was severely depressed. Coronary arteriography revealed disease in three major vessels, with a long, calcified lesion in the middle segment of anterior descending artery (ADA) (Figure 1A). Surgery was ruled out due to the high risk involved and the poor condition of the distal beds. Thus, percutaneous revascularization of the ADA was attempted.

With great difficulty, we were able to advance a hydrophilic guidewire along the middle segment of the ADA with a 1.25×10 mm balloon; it was necessary to dilate the proximal portion of the lesion and gradually push the balloon until it was completely advanced. Then, dilatation was repeated in the most critical stenosis with a 2×15 mm balloon, but adequate expansion was not achieved (Figure 1B). Thus, an AngioSculpt balloon (2×10 mm) was utilized but, after several attempts, it did not pass through the entire lesion and, therefore, as with the previous balloon, it was inflated in the proximal portion (Figure 1C). Once deflated, the attempt was made...
to advance it without success. Upon withdrawing it, it
could only be moved a few millimeters and remained
entrapped within the coronary artery. The attempt was
again made to advance it with rotating movements and
withdraw it, unsuccessfully. Another guidewire was
introduced with another parallel balloon in the attempt
to free it (with the buddy balloon technique), again
unsuccessfully. After several attempts, a nonocclusive
dissection was produced in left main coronary artery,
caused by the deep intubation of the guide catheter (Figure
1D). Finally, emergency surgery was indicated in order
to resolve the situation. As the heart surgeon was unable
to withdraw the catheter, he cut it at the level of the ostium
of the left main coronary artery, and it proved impossible
to bridge the artery because of the poor condition of the
bed and the severe calcification. The patient was
discharged, but died 6 months after the procedure.

Percutaneous treatment of diffuse, calcified lesions is
associated with a high risk of complications, and the
advance and release of the devices, as well as their correct
expansion, prove problematic. Although the rotoblator
is the device of choice in the management of these lesions,
one alternative is the use of balloons that cut the plaque,
such as the cutting balloon or the AngioSculpt balloon.¹
A possible complication can be the entrapment of this
device, as occurred in this case, and a hypothetical
explanation would be that the nitinol guidewire that forms
a spiral around the AngioSculpt balloon could get caught
on the calcium spicules on withdrawal (Figure 2).

There are a number of strategies in the attempt to
withdraw an entrapped balloon catheter, such as inflation-
deflation, advancing and rotational movements, the buddy
balloon technique and deep intubation of the guide
catheter. In this case, all of them failed and, thus, it was
ultimately decided to perform surgical withdrawal. The
operation usually consists in placing a graft in the damaged
artery and removing foreign elements from the aorta to
prevent thrombus formation.² It is up to the surgeon to
decide whether to attempt to withdraw the entrapped
catheter because of the arterial damage that this maneuver
can produce.

This report describes a serious complication of the
use of the AngioSculpt catheter in diffuse, heavily
calcified lesions. We consider it important to avoid the
inflation of the balloon if it has not gone beyond the
most critical lesion. When the balloon catheter can not

Figure 1. A: cranial anteroposterior
projection showing a long calcified lesion
in the middle segment of anterior
descending coronary artery. B: conventional
balloon dilatation with residual plaque,
indicating the difficulty involved in its
rupture. C: dilatation with the AngioSculpt
balloon catheter at the level of the lesion.
D: final angiography showing distal
dissection of left main coronary artery
(white arrow), with reduced flow in anterior
descending coronary artery.
be withdrawn, one possible cause is that the guidewire that surrounds it gets caught in the calcium spicules. One maneuver that can be employed to withdraw it would be advancing and rotating the balloon to release it. Finally, this case illustrates the importance of considering rotational atherectomy in the treatment of diffuse calcified lesions.

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REFERENCES