

Synchronized Suction-Injection Angioscope

This technology offers an angioscope that uses a catheter to view, diagnose, and treat Chronic Total Occlusions (CTO). This method would provide the potential with a faster procedure and faster CTO clearance.

What is the Problem?

Over the next two decades, the proportion of the U.S. population with cardiovascular disease is expected to rise to 45%. A chronic total occlusion (CTO) occurs in cardiovascular disease patients when slow build-up of plaque eventually causes a complete blockage of a blood vessel and is diagnosed in about 30% of patients with coronary disease. The restricted blood flow due to the CTO stops oxygen from being properly circulated by the blood, which can cause patients to experience pain and fatigue. In order to treat the CTO in arteries, doctors can first visualize the blockage by using an angioscope. The angioscope is a flexible cable that is used for high resolution images of the interior of vessels when it is inserted and threaded through a vessel. However, angioscope usage comes with a risk of creating high pressures inside a weakened artery that would further damage or even rupture the artery.

What is the Solution?

The solution is a design for an angioscope that uses a catheter to view, diagnose, and treat Chronic Total Occlusions (CTO) usually found inside coronary arteries. The catheter consists of multiple optical channels that transmit light for viewing the interior region of the artery and two additional lumens that allow fluid to move between them. The first channel is a saline injection channel and the second a suction lumen used to remove saline and blood from within the artery. The injection of saline and suction of blood helps clear the opaque medium between the catheter and the CTO, which allows the interventionist to observe the occlusion and treat the artery. Current catheters utilize injection of saline and suction of the saline-blood mixture at constant pressures, but this solution involves the synchronization of the injection and the suction, such that they are equal in terms of mass flow rates of the fluid instead of the pressure, which prevents the buildup of high pressure within the artery. The synchronization of the two channels is done using a syringe pump which controls both lumens or by two different syringes/pumps optimized by a flow controller that regulates the mass flow rates.

What Differentiates it from Solutions Available Today?

Existing designs can create high pressures inside a weakened artery, which can further damage or even rupture the artery. The solution generates lower pressure in the artery compared to current models. This reduction in pressure could reduce the risk of artery rupture or damage, and perhaps make coronary CTO's more approachable for direct intervention. Additionally, this

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Category

Device/Cardiovascular
Device/Imaging
Selection of Available
Technologies

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innovation has the potential to speed up the procedure by allowing CTO's to be cleared faster and more often, conferring greater ease for both doctors and patients facing treatment of CTO.

Patent Information:

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