eCLIPs: Enabling coil retention and flow diversion for the treatment of cerebral aneurysms

The successful treatment of wide-neck bifurcation aneurysms remains a challenge for even the most experienced physicians in the neurointervention field. Developing at a branching point of an artery, the high-velocity blood flow at this location creates a large amount of pressure on the aneurysm. Given this demanding anatomy, it is not surprising that coils struggle to stay retained, and aneurysms reopen over time.

SINCE 2008, EVASC HAS BEEN developing the eCLIPs, a novel endovascular device designed to treat cerebral aneurysms, which has now been used clinically in a challenging set of wide-neck aneurysms. In order to optimise coil retention and enhance flow disruption, eCLIPs combines properties from both stents and flow diverters.

Here, speaking to *NeuroNews*, Leif Sørensen from Aarhus University Hospital (Aarhus, Denmark) outlines his clinical experience with the device, and details how its design has contributed to the low recurrence rates that he and his team have observed so far.

What are the eCLIPs' distinguishing features? Have they overcome any limitations of other devices?

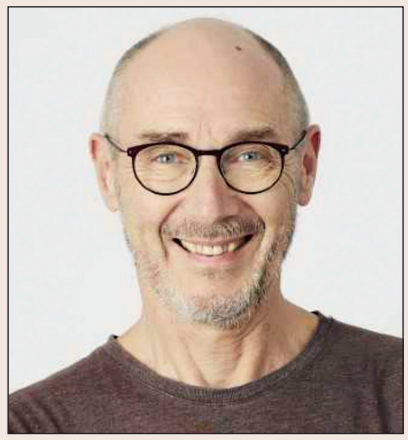
The usual way to treat bifurcation aneurysms is to place small coils into the aneurysm and occlude it through coils, or other intrasaccular contents. However, because you have this water-hammer effect, where the bloodstream is hammering into the aneurysm at least 60 times a minute, these coils tend to compress, and you have a certain degree of reopening of the aneurysm.

What we really want is to have the bloodstream pushed, or diverted away from the aneurysm, out into the branches. This is exactly what the eCLIPs is doing. It has two effects: it helps to cover the neck so the coils are retained inside the aneurysm while also providing a flow diversion effect.

How does the design permit these benefits?

The eCLIPs is made of two sections; one that covers the aneurysm neck, and the other we call the anchor segment, which prevents migration. The neck-bridging leaf segment is designed like a feather. Unlike standard stents that have very open constructions, this design produces flow disruption, and mitigates the water-hammer effect, and thus, the tendency to compress the coils. This design feature allows the neck-bridging leaf to act as a platform for neo-endothelial growth, permanently exteriorising the aneurysm from the circulation (Marotta *et al*. *J Neurosurg*. March, 2017 https://thejns.org/doi/abs/10.3171/2016.10.JNS162024). This is what distinguishes this device from others on the market.

The anchor section is the part that is placed at one of the two branches at the T-crossing. It will make contact with the vessel wall, and through this, will secure the clip. It allows the treating physician to enter into the aneurysm through the small rib structures to deploy the coil inside.



Leif Sørensen

How many cases have you treated so far using the eCLIPs?

Locally, we have implanted the device in around 20 patients over the last few years, and I have also been proctoring cases in several hospitals around Europe.

You recently presented at the Society of NeuroInterventional Surgery's virtual meeting. Could you tell us about this data?

This was a particularly challenging group of aneurysms, as they all had a very wide neck and short distance between the neck and dome (low aspect ratio). They would be a difficult set to treat no matter what device you use, as they were so open.

> **"With the eCLIPs, we have had no recurrences. In fact, the aneurysms are becoming more closed over time."**

But, because it is possible to deploy the eCLIPs outside of the neck of the aneurysm, as the device is not bothered by the size of the neck, you can get both coil retention and a flow diversion effect.

In this particular cohort of difficult aneurysms, we have 19 patients where we now have a complete follow-up data-set, and we have seen no recurrences (De Vries J, *et al*. *J NeuroIntervent Surg* 2020;0:1–6. doi:10.1136/neurintsurg-2020-016354). If you measure how tight the aneurysms were coiled at the end of the operation and look at them around 11.5 months after the operation, we can see that within the aneurysms that were not closed, nearly all of them were completely closed at the first follow-up. They have gone from a not-so-favourable to a favourable group.

With standard techniques, you usually get a lot of recurrences. But with the eCLIPs, we have had no recurrences. In fact, we have observed the opposite; the aneurysms are becoming more closed over time.

Did these results surprise you?

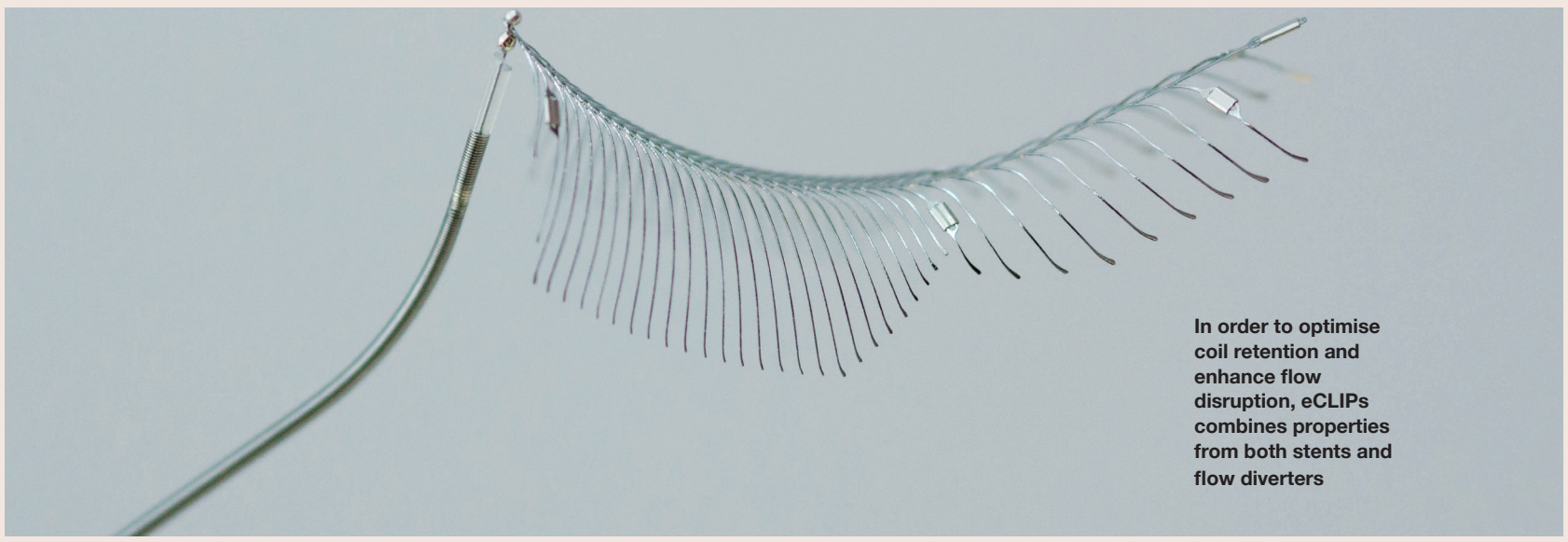
In theory, based on the design of the device, we should be observing results as good as this. But to see that it works in practice is very fulfilling.

Do you believe that the eCLIPs will offer a new standard of care?

Yes, or at least I hope so. I am so happy with this device. I really hope we can have it on the market because there is a need for this.

Of course, you need to train in order to use it, because there are some technical difficulties you have to overcome when treating aneurysms with the eCLIPs, as well as some anatomical demands that the treating physician should be aware of. I am working with the company and carrying out some workshops, but in addition to this, training in a bench model, or an animal model, will help with the learning curve.

There is also a new version of the product that has been launched, and it has recently received CE mark. While it encompasses the same design, the delivery system is a little different, and it allows the treating physician to use all catheters to deliver the device. I have had less experience using this new device, but it looks as though it should be easier to use.



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