Diaphragm of the ICA, an underdiagnosed cause of stroke in young

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Disclosures
• None

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Lenck S, Labeyrie MA, Saint Maurice JP, Tarlov N, Houdart E

• Since that publication, the numbers of cases has increased at Lariboisière
• And a second paper published more recently has confirmed our data (Joux et al, Stroke Dec 2014)

Diaphragm is an endoluminal web i.e. an obstacle larger than longer (contrarily to atherosclerosis)

Differences between diaphragm and atherosclerosis

No internal lumen stenosis: Doppler is negative
Emboli are due to red cell thrombi: antiplatelet are inefficient
Point is to recognize that picture!

51 yo man, without vascular risk factors

• Who did 2 stroke in the right MCA territory
• Of undetermined cause
• The second one while treated by aspirin
Second angio CT was said to be normal while it showed a typical aspect of diaphragm better seen on conventional angio

That shows the behavior of the flow in this disease: stasis in a recess explaining embolic formation.

Diaphragm may be visible on angio CT but the technique is crucial

MPR (visible) MIP (not)

48 yo man with recurrent left MCA infarct under aspirin: angioCT said normal, conventional angio showed the diaphragm and overall the stasis inside the recess.

Emboli are caused by blood stasis inside the recess making antiplatelet inefficient.

- Lariboisière series: 50% recurrent stroke under aspirin
- Joux et al series: 30% recurrent stroke

Diaphragm can cause large emboli: 54 yo woman NIHSS 14
Thrombectomy

And diaphragm was found on the ICA bifurcation, in this patient free of other cause of stroke

What is the nature of the diaphragm?

Endovascular optical coherence tomography (OCT) can show the same data (intima in yellow)

OCT at the level of the diaphragm showing the same optical signal as intima

Endovascular treatment is stenting alone (balloon dilation is unnecessary)

Stroke dec 2014
In this series, 7 patients have been operated
Histology showed that the web was an intimal proliferation

• Purpose is to suppress the blood stasis in the recess
• There is no atherosclerotic debris
• Stent always prevents against recurrent embolism in our experience
Most of the stroke due to diaphragm occurs before 60 yo

- The study FUTURE has explored 722 strokes in patients < 50 yo (*Stroke* 2014; 45: 1157-1160)
- 33 % remain “undetermined” despite extensive explorations
- I suspect that part of them were due to diaphragm
- However, one cannot recognize a disease if the semiology is ignored

To conclude

- Angio CT should be systematic in the exploration of stroke (Doppler cannot see diaphragm)
- Pay attention to an obstacle larger than longer
- In case of recurrent stroke in young patients, conventional angiography is now performed in our center