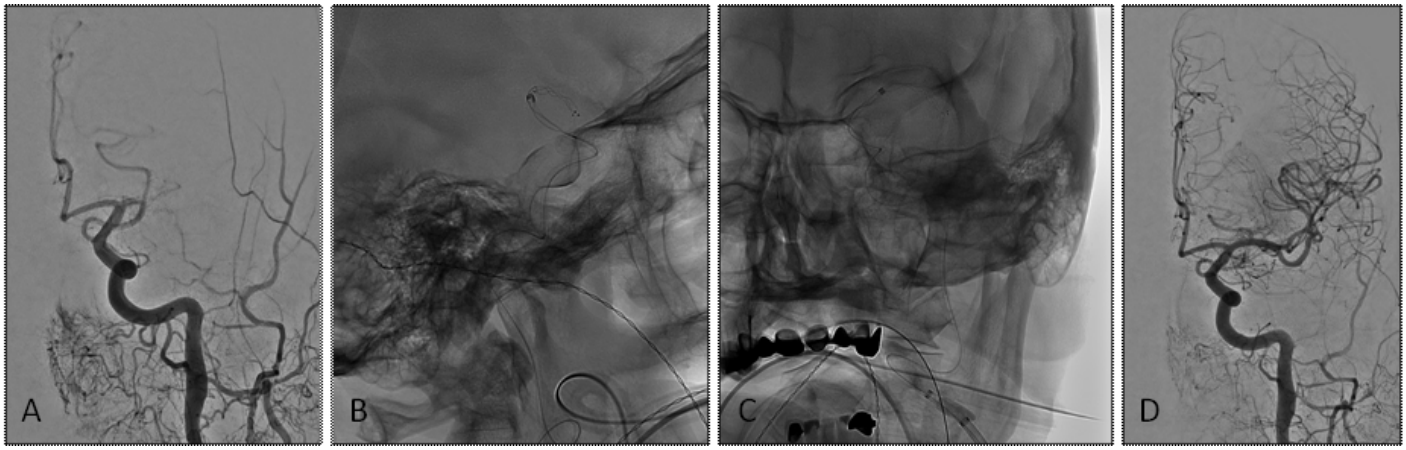
ARTS (Aspiration-Retriever Technique for Stroke): A novel method for stroke treatment

Ischemic stroke is not only one of the worldwide leading causes of disability and mortality but is also a significant burden on health systems.

Actually the standard treatment for the acute event is based on a clot buster, injected through a vein of the arm, called rTPA (recombinant tissue plasminogen activator).

Multiple studies have proved that the efficacy of this treatment is limited when the vessel occlusion from the clot involves one of the major arteries that through the neck reach and supply the brain or one of the biggest branching vessels into the brain.



Left middle cerebral artery occlusion, major artery supplying the brain (A). ARTS allowed removal of the clot (B,C) with complete recanalization of the vessel (D).

However, recent advances in technology and development of large and flexible aspiration catheters (long hollow tubes advanced within the vessel, through a small incision made at the level of the groin, up to the level of the brain) as well as latest generations of stent retrievers (metal mesh, commonly used by cardiologist to treat the patient with heart infarct), have resulted in earlier and more efficient reopening of large arterial occlusions and subsequent improved clinical outcomes.

The flexible large bore catheter is advanced," via the artery in the groin through the vessels of the abdomen and chest, until reaching the occlusion site at the level of the clot. Through this catheter, smaller catheters called microcatheters are advanced past the occlusion site.

The stent retriever device is utilized as a "fish net" to capture and retracts the clot out of the body

while aspiration is done from the large bore catheter.

The combined action of these two tools has been demonstrated, not only to improve the efficacy and speed of this process of clot removal with vessel reopening and reperfusion of the brain, but even more important to considerably improve patient outcomes in terms of mortality and clinical deficit, improving individual functionality and quality of life.

The purpose of this study was to determine the safety, effective and quickness of this minimally invasive vascular procedure, small incision at the groin with no necessity for stitches, utilizing simultaneously an Aspiration Catheter and a Stent Retriever as a Technique for Stroke treatment (ARTS).

This study evaluated 42 patients treated over a 19-month period between August 2013 and February 2015.

Patients included in this series were found to have an occlusion of one of the large brain vessel with a small brain infarction, with a large area of brain hypoperfused but still viable brain tissue that could be saved with a prompt and effective “unclogging” procedure.

The innovative technique was based on the synergistic effect of the aspiration catheter, suctioning one of the two extremities of the clot and the stent retriever catching the other edge, in order to “sandwich the clot” that could be entirely removed from the body, minimizing the risk of clot disengagement or fragmentation.

The study demonstrated that this technique was successful in achieving almost or complete vessel reopening in 97.6 % of cases (almost complete = 18/42 pts, complete = 23/42 pts). But even more relevant, at 3 month follow-up, 65.7 % of the successfully treated patients reacquired a complete pre-stroke functionality or were affected by minor residual clinical deficit (primarily involving strength, sensitivity or speech).

The findings of this study support the hypothesis that the combination of physician skills and “creativity” combined with evolving technology significantly impacted surgical efficacy and subsequently improved patients clinical outcomes in Stroke treatment.

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