

6th ACST-2 Collaborators' Meeting in Valencia, Spain
24th and 25th September 2018



US guided deep cervical plexus block

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CATTEDRA ED UNITA' OPERATIVA DI CHIRURGIA VASCOLARE



Disclosure

No conflict of interest related to this presentation



General anaesthesia versus local anaesthesia for carotid surgery (GALA): a multicentre, randomised controlled trial

GALA Trial Collaborative Group*

Summary

Lancet 2008; 372: 2132-42

Published Online
November 27, 2008
DOI:10.1016/S0140-
6736(08)61699-2

See [Comment](#) page 2092

*Members listed at end of paper

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Background The effect of carotid endarterectomy in lowering the risk of stroke ipsilateral to severe atherosclerotic carotid-artery stenosis is offset by complications during or soon after surgery. We compared surgery under general anaesthesia with that under local anaesthesia because prediction and avoidance of perioperative strokes might be easier under local anaesthesia than under general anaesthesia.

Methods We undertook a parallel group, multicentre, randomised controlled trial of 3526 patients with symptomatic or asymptomatic carotid stenosis from 95 centres in 24 countries. Participants were randomly assigned to surgery under general (n=1753) or local (n=1773) anaesthesia between June, 1999 and October, 2007. The primary outcome

No definite difference in outcomes between GA and LA

Control Trials number ISRCTN00525237.

Findings A primary outcome occurred in 84 (4.8%) patients assigned to surgery under general anaesthesia and 80 (4.5%) of those assigned to surgery under local anaesthesia; three events per 1000 treated were prevented with

..but during GA cerebral monitoring is mandatory

Interpretation We have not shown a definite difference in outcomes between general and local anaesthesia for carotid surgery. The anaesthetist and surgeon, in consultation with the patient, should decide which anaesthetic technique to use on an individual basis.

Funding The Health Foundation (UK) and European Society of Vascular Surgery.

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Original Contribution

Intraoperative Completion Studies, Local Anesthesia, and Antiplatelet Medication Are Associated With Lower Risk in Carotid Endarterectomy

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German Carotid Registry 2009-2014

and perioperative variables and in-hospital stroke or death rates after carotid endarterectomy.

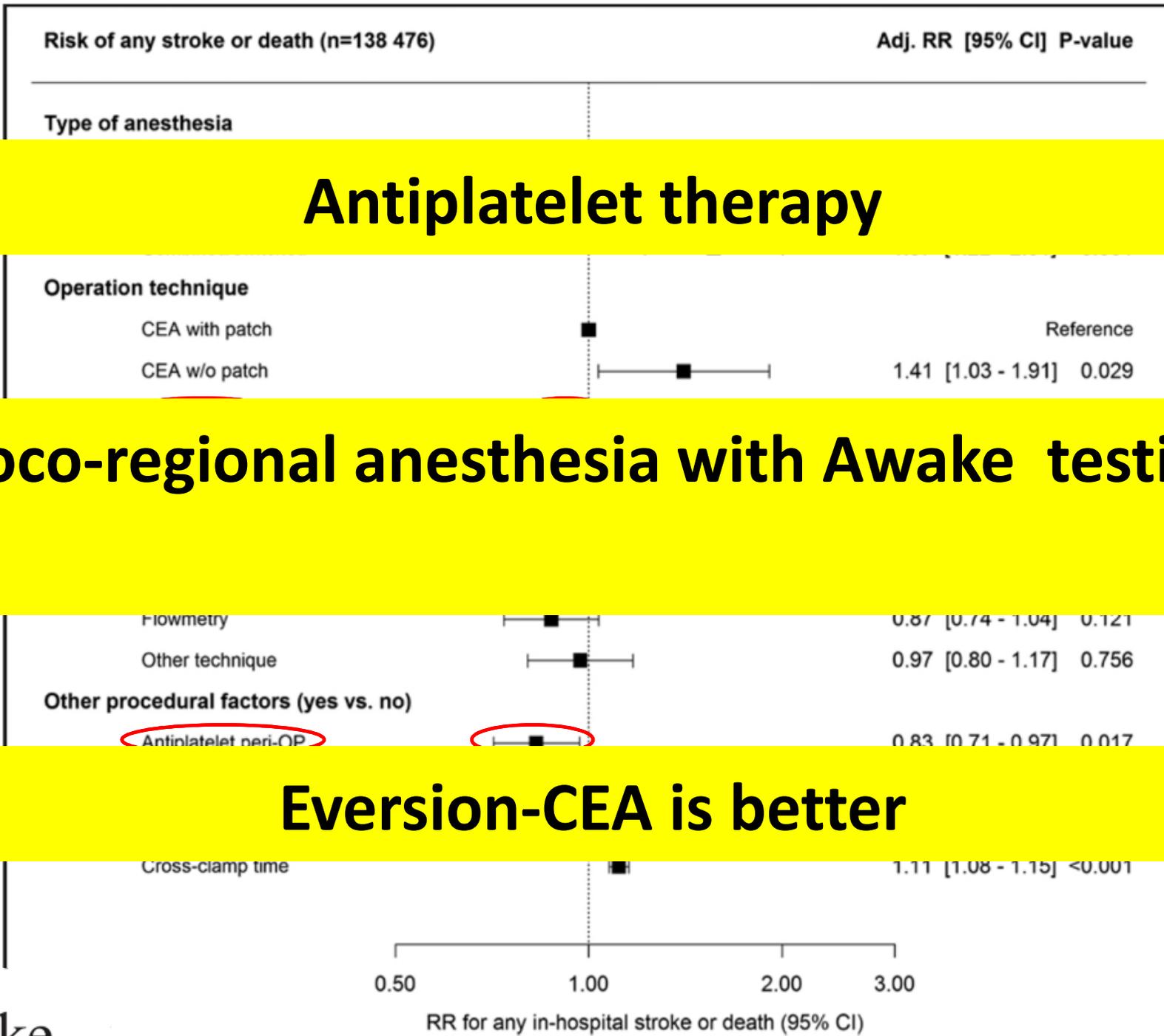
Methods—Between 2009 and 2014, overall 142074 elective carotid endarterectomy procedures for asymptomatic or symptomatic carotid artery stenosis were documented in the database. The primary outcome of this secondary data analysis was in-hospital stroke or death. Major stroke or death, stroke, and death, each until discharge were secondary outcomes.

142074 Patients

with patch plasty compared with primary closure (RR, 0.71; 95% CI, 0.52–0.97), intraoperative completion studies by duplex ultrasound (RR, 0.74; 95% CI, 0.63–0.88) or angiography (RR, 0.80; 95% CI, 0.71–0.90), and perioperative antiplatelet medication (RR, 0.83; 95% CI, 0.71–0.97). No shunting and a short cross-clamp time were also associated with lower risks; however, these are suspected to be confounded.

Conclusions—Local anesthesia, patch plasty compared with primary closure, intraoperative completion studies by duplex ultrasound or angiography, and perioperative antiplatelet medication were independently associated with lower in-hospital stroke or death rates after carotid endarterectomy. (*Stroke*. 2017;48:00-00. DOI: 10.1161/STROKEAHA.116.014869.)

Key Words: anesthesia ■ angiography ■ death ■ endarterectomy, carotid ■ stroke



Antiplatelet therapy

Loco-regional anesthesia with Awake testing

Eversion-CEA is better

Which monitoring during EAC??

BJA

Intraoperative neuromonitoring in major vascular surgery

British Journal of Anaesthesia, 117 (S2): ii13–ii25 (2016)

doi: 10.1093/bja/aew218
Special Issue

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Table 2 Sensitivity, specificity, and diagnostic odds ratio reported by Guay and Kopp³⁵

Monitor (number of studies)	Sensitivity (95% CI)	Specificity (95% CI)	Diagnostic odds ratio (95% CI)	Cut-off points
EEG (n=5)	0.70 (0.58–0.80)	0.96 (0.94–0.97)	65.3 (20.51–207.71)	
Evoked potentials (n=3)	0.84 (0.66–0.95)	0.78 (0.69–0.86)	17.7 (2.38–123.85)	Response amplitude 0–50% of baseline
Transcranial Doppler (n=8)	0.81 (0.69–0.91)	0.92 (0.89–0.94)	58.1 (23.0–146.3)	48–70% reduction
Near-infrared spectroscopy (n=5)	0.74 (0.54–0.89)	0.82 (0.76–0.88)	12.1 (3.52–41.24)	15–20% reduction
Stump pressure (n=15)	0.75 (0.69–0.81)	0.88 (0.86–0.89)	27.84 (13.38–57.94)	25–50 mm Hg

Sensitivity 70-85%

Specificity 78-96%



Available online at www.jbr-pub.org

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JBR

The Journal of Biomedical Research, 2017, 31(0):000–000

Review Article

Monitoring cerebral ischemia during carotid endarterectomy and stenting

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Keeping patient awake for real time neurocognitive assessment is effective and essential

Abstract

Current therapy for carotid stenosis mainly includes carotid endarterectomy and endovascular stenting, which may incur procedure-related cerebral ischemia. Several methods have been employed for monitoring cerebral ischemia during surgery, such as awake neurocognitive assessment, electroencephalography, evoked potentials, transcranial Doppler, carotid stump pressure, and near infrared spectroscopy. However, there is no consensus on the gold standard or the method that is superior to others at present. Keeping patient awake for real time neurocognitive assessment is effective and essential; however, not every surgeon adopts it. In patients under general anesthesia, cerebral ischemia monitoring has to rely on non-awake technologies. The advantageous and disadvantageous properties of each monitoring method are reviewed.

Keywords: cerebral ischemia monitoring, carotid endarterectomy, carotid artery stenting

The sensibility and specificity of cerebral oximetry, measured by INVOS – 4100, in patients undergoing carotid endarterectomy compared with awake testing

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F. BENEDETTO ¹, D. RISITANO ², A. NOTO ², R. MESSINA ², A. DAVID ²

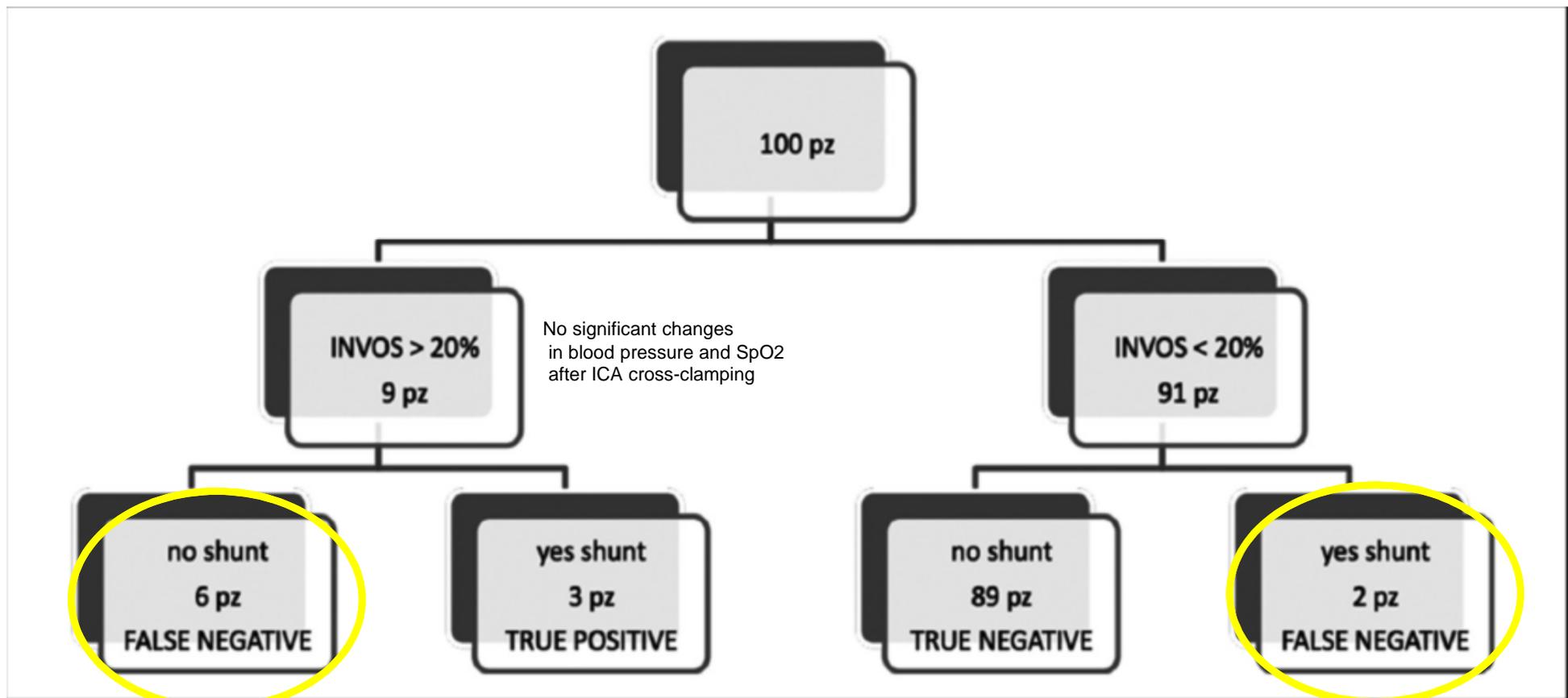
(Minerva Anestesiol 2012;78:1126-35)

Comparison of the INVOS-4100 cerebral oximeter and the neurologic functions,
by means of detecting cerebral ischemia induced by carotid cross-clamping,
in patients undergoing CEA under Loco-regional Anesthesia (LA).

Methods:

- 100 consecutive patients scheduled for CEA under LA from January 2009 to December 2010.
- A drop greater than 20% was considered as an indicator of cerebral ischemia that might predict the need for carotid shunting.
- Patients were only shunted based on the awake testing.
- We analyzed and compared : blood pressure and partial oxygen saturation (SpO₂), at the beginning and after ICA cross-clamping; contralateral rSO₂ percentage; neurological status; carotid stenosis percentage; presence and type of prior neurological symptoms

Figure 1.—Summarized algorithm of all patients.



No significant changes
in blood pressure and SpO2
after ICA cross-clamping

The exact percentage of INVOS value reductions after ICA cross-clamping in these two false negative patients are 1.54% and 18.18%.

Over shunting

In these patients, CO presented a rapid decrease after carotid clamping, followed by a significant rise in rSO2 levels with the return of cerebral perfusion.

Potential Stroke??☹☹

**BEST TECHNIQUE FOR CEREBRAL MONITORING REMAINS
AWAKE TESTING**

Usually Deep and Superficial Cervical Plexus Block
plus superficial skin infiltration



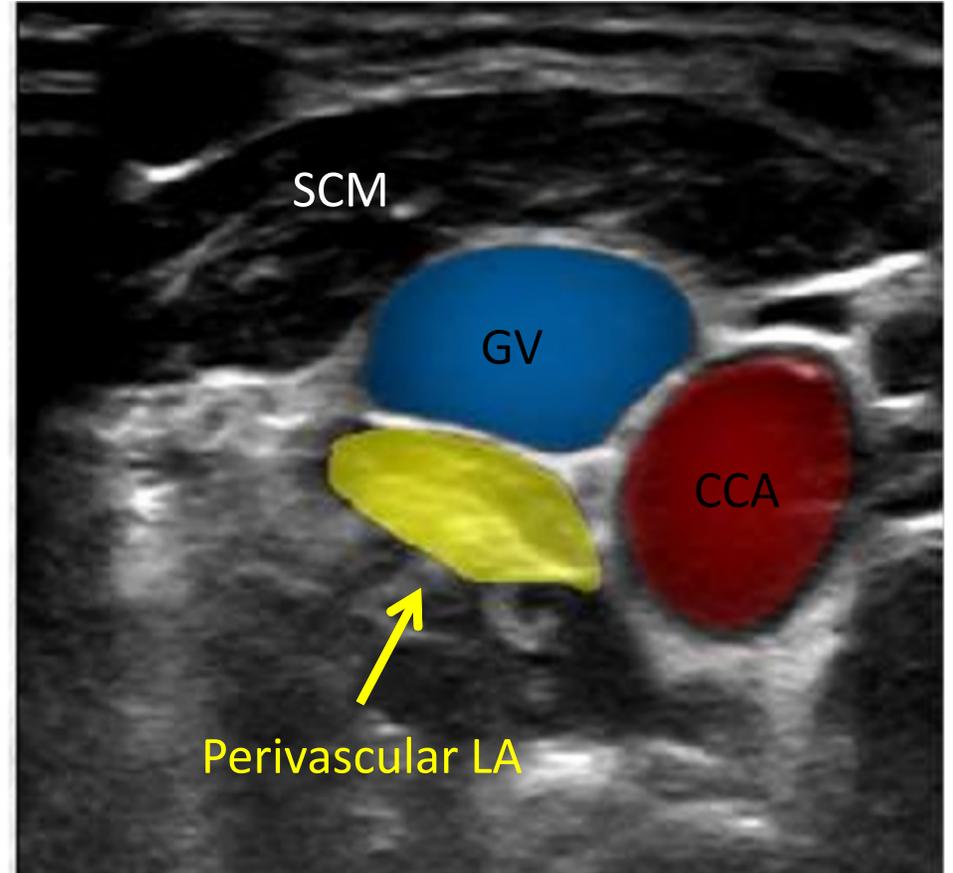
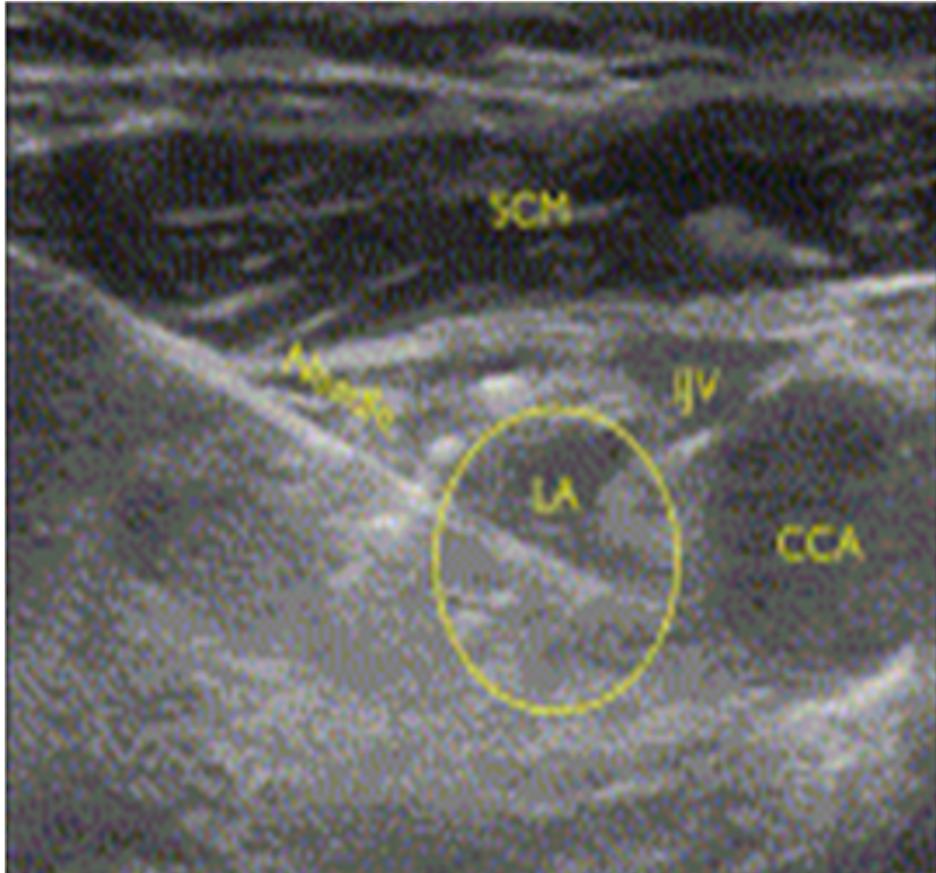
Risk of inadvertent vessels puncture
High rate of nerve dysfunction
High dosage of anesthetic drugs

How to improve??

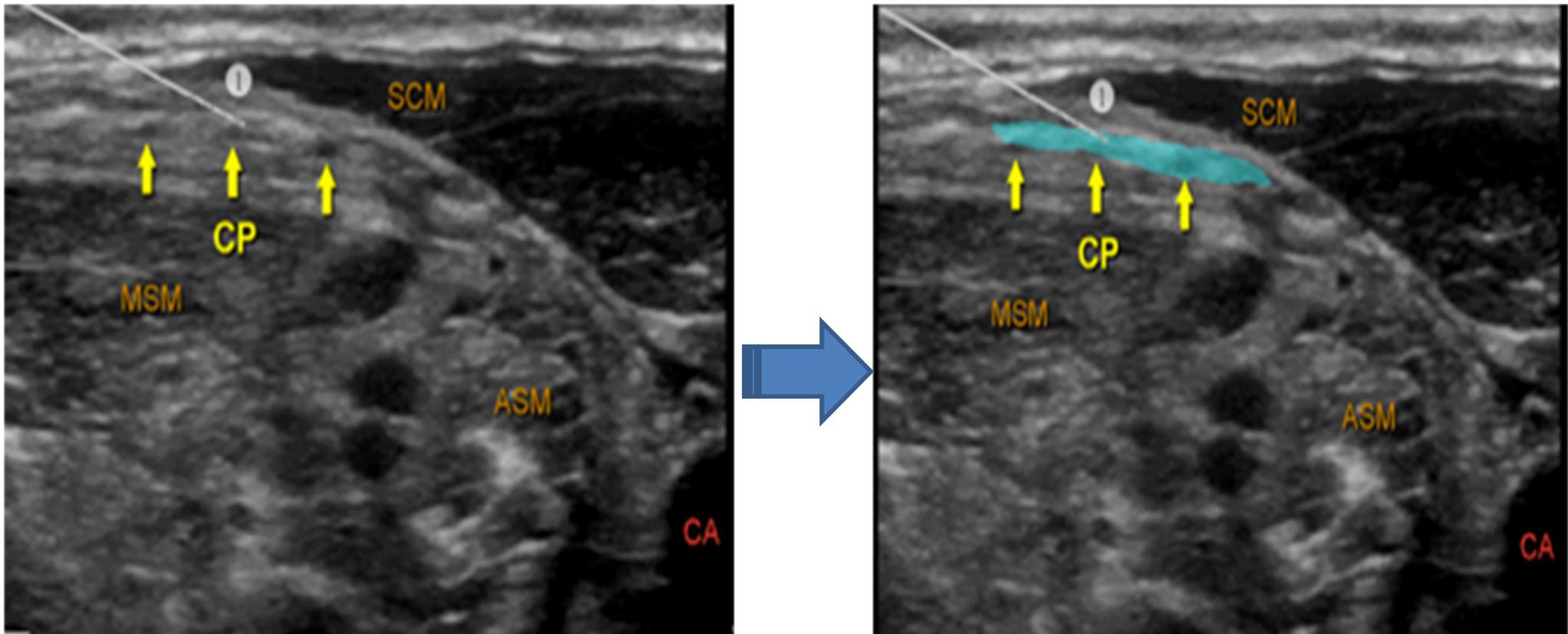
Initial experience

Ultrasound-guided
superficial cervical block
and perivascular local anesthetic infiltration





Perivascular local anesthetic infiltration
with 3-5 ml of Ropivacaine 5mg/ml



Retracting the needle until the posterior border of the SCM a
Superficial cervical block by
4-5 ml of Ropivacaine 5mg/ml is done

Early results on echo-guided anesthesia in carotid endarterectomy

Between January 2015 and December 2016

244 patients were submitted to CEA under loco-regional anesthesia.
Of these 193 (79%) patients were symptomatic and 51 (21%) asymptomatic.

Perioperative neurological complications (minor TIA) were reported in 2 patients (0.8%)

Mortality rate was null

Selective carotid shunts were required in 3 patients (1.2%)

Peripheral nerve dysfunction was reported in 5 patients (2%)

Hoarseness was the primary symptom (70%),
which completely resolved in all patients before two weeks from the procedure

Cervical hematomas due to anesthetic procedure and/or
accidental vessels puncture was not reported

Supplementary anesthetic infiltration was required in 19 patients (7.8%)

Conversion to general anesthesia wasn't reported



Ultrasound-guided intermediate cervical plexus block and perivascular local anesthetic infiltration for carotid endarterectomy

A randomized controlled trial

	Group 1	Group 2	
Primary block technique			
C2–C4 compartment	0.75 % ropivacaine (20 ml)	0.75 % ropivacaine (20 ml)	
Carotid sheath	0.9 % saline (5 ml)	0.75 % ropivacaine (5 ml)	
Jugular groove	1 % prilocaine (5 ml)	1 % prilocaine (5 ml)	
Supplementation with 1 % prilocaine (mean, range)			p-value
Skin	2.0 ml (0–15 ml)	3.3 ml (0–20 ml)	0.39
Carotid sheath (ml)	0.9 ml (0–5.5 ml)	1.5 ml (0–10 ml)	0.4
Carotid sheath (%)	30 % (n = 6)	40 % (n = 8)	0.74
Other locations	0.8 ml (0–5 ml)	0.1 ml (0–1.5 ml)	0.05
Total	3.7 ml (0–16 ml)	4.9 ml (0–20 ml)	0.46
No supplementation necessary	n = 7 (35 %)	n = 7 (35 %)	1.0
Comedication			
Sufentanil (mean, range)	7.1 µg (0–15 µg)	8.8 µg (0–20 µg)	1.0
Clonidin (mean, range)	21.2 µg (0–150 µg)	26.5 µg (0–225 µg)	1.0

A total of 40 patients randomly assigned.

An ultrasound-guided intermediate cervical plexus block (20 ml of 0.75 % ropivacaine) at the level of the fourth cervical vertebra was performed.

In a second step, the needle was inserted from posterolateral to anteromedial (in-plane technique) relative to the internal carotid artery and then, 5 ml of 0.75 % ropivacaine (group 2) or 5 ml of 0.9 % saline (group 1) was injected.

Table 3 Block-related side effects and patient comfort			
	Group 1	Group 2	P-value
1. Cervical plexus block:	Ropivacaine	Ropivacaine	–
2. Perivascular infiltration:	Saline	Ropivacaine	–
Block-related side effects			
None	n = 7	n = 3	0.27
Hoarseness	n = 11	n = 13	0.75
Cough	n = 1	n = 11	0.001
Dysphagia	n = 5	n = 10	0.32
Horner's syndrome	n = 4	n = 8	0.3
Hypoglossal paralysis	n = 2	n = 7	0.13
Patient comfort			
Very satisfied	n = 5	n = 5	–
Satisfied	n = 10	n = 7	–
Less satisfied	n = 5	n = 8	–
Unsatisfied	n = 0	n = 0	0.14
Antihypertensive drugs and vasopressors			
Up-regulation (noradrenaline)	n = 9	n = 13	0.34
Down-regulation (urapidil)	n = 14	n = 9	0.2

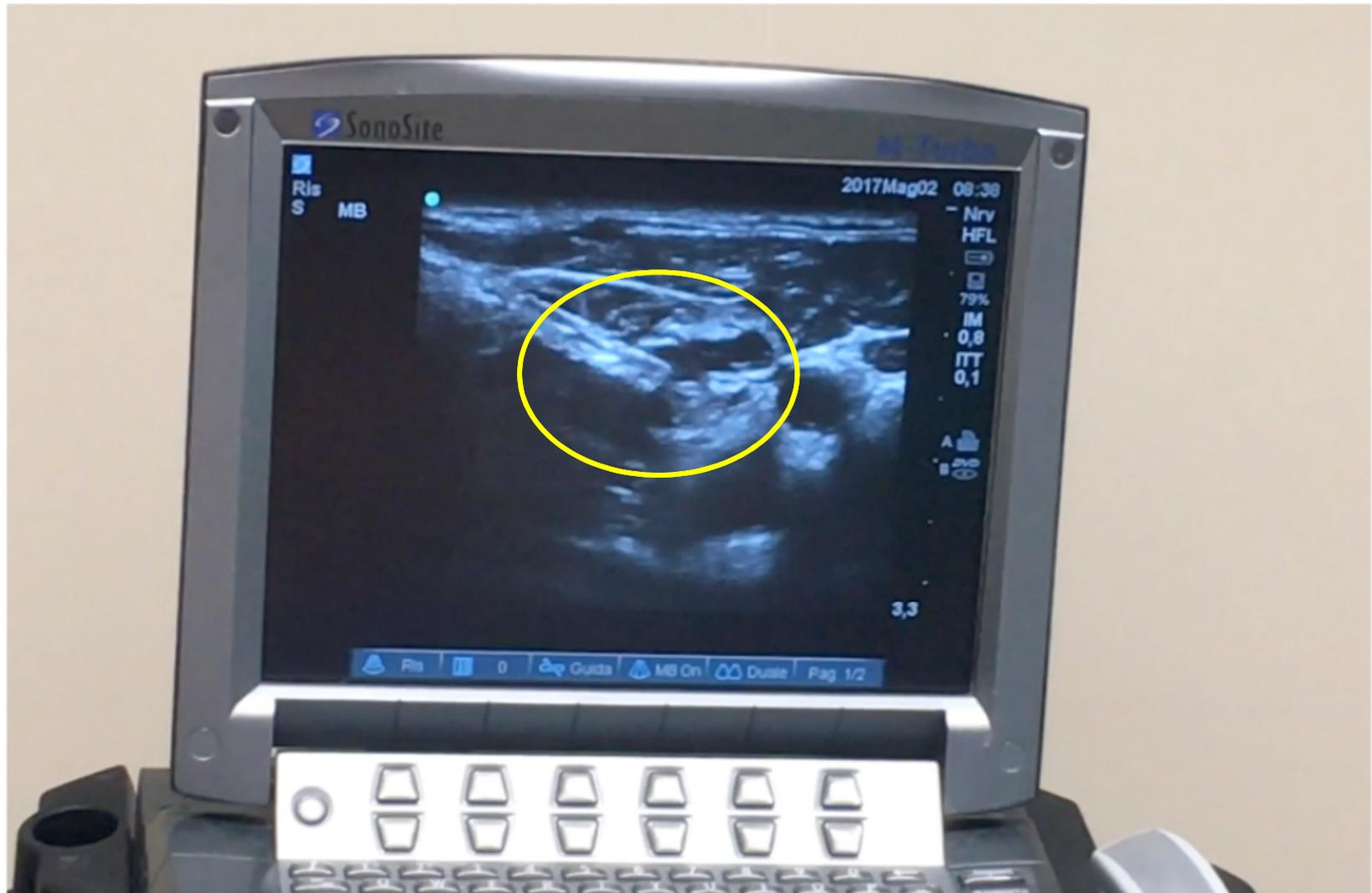
No significant adjunct of anesthetics in both groups and patient comfort ($p = 0.144$).

A trend towards a higher complication rate was observed in group 2 (perivascular injection).

An additional periarterial infiltration showed no advantage. Abandoning this technique leads to a relevant simplification of the blocking technique and tends to reduce block-related side effects

Current technique

Ultrasound-guided
superficial cervical block



Current technique:

Ultrasound-guided
superficial cervical block

video

Current technique:

Ultrasound-guided
superficial cervical block

Pushing the needle until the posterior border of the SCM a
Superficial cervical block by injecting
9-12 ml of Ropivacaine 5mg/ml
into the middle cervical fascia

Retracting the needle until the **subcutaneous tissue** 3 ml of
Ropivacaine 5mg/ml is done

Conclusions

One single puncture

Avoidance of accidental vascular punctures and nerve dysfunction

Reduction of the local anesthetic drugs

No need for additional anesthetic infiltration by the surgeon

No need for additional administration of opioids/sedatives