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Intraoperative hypotension is a risk factor for postoperative silent brain ischemia in patients with preoperative hypertension undergoing carotid endarterectomy

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ABSTRACT

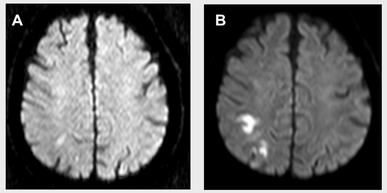
Background: **Intraoperative hemodynamic instability during carotid endarterectomy (CEA) has been associated with an increased risk of procedural stroke. Diffusion-weighted imaging (DWI) lesions have been proposed as a surrogate marker for perioperative silent cerebral ischemia. This study aimed to investigate the relation between perioperative blood pressure (BP) and presence of postoperative DWI-lesions in patients undergoing CEA.**

Methods: **A retrospective analysis was performed based on symptomatic CEA-patients included in the MRI-substudy of the ICSS. Relative intraoperative hypotension was defined as a decrease of intraoperative systolic BP ≥20% compared to preoperative ('baseline') BP, absolute hypotension was defined as a drop in systolic BP <80mmHg. Primary endpoint was presence of any new DWI lesions on postoperative MRI (DWI-positive). Occurrence and duration of intraoperative hypotension was compared between DWI-positive and DWI-negative patients as was the magnitude of the difference between pre- and intraoperative BP.**

Results: **55 symptomatic CEA-patients were included of whom eight were DWI-positive. DWI-positive patients had a significantly higher baseline systolic (186±31 vs 158±27 mmHg, *p*=.011) and diastolic BP (95±15 vs 84±13 mmHg, *p*=.046) as compared to DWI-negative patients. Other preoperative characteristics did not differ. Relative intraoperative hypotension compared with baseline occurred in 53/55 patients (median duration 34 minutes; range 0 – 174). Duration of hypotension did not significantly differ between the groups (*p*=.088). Mean systolic intraoperative BP as compared to baseline, revealed a larger drop of BP (-37±29mmHg) in DWI-positive compared to DWI-negative patients (-14±26mmHg, *p*=.024). Absolute intraoperative systolic BP values did not differ between the groups.**

Conclusions: **: In this exploratory study, high preoperative BP and a larger drop of intraoperative BP were associated with periprocedural cerebral ischaemia as documented with DWI. These results call for confirmation in an adequately sized prospective study, as they suggest important consequences for perioperative hemodynamic management in carotid revascularization.**

BACKGROUND



18% risk of new DWI lesions after CEA[1]

Associated with increased risk of future TIA/stroke[2]

BACKGROUND

CEA: Haemodynamic events

(bradycardia, asystole, severe hypotension)

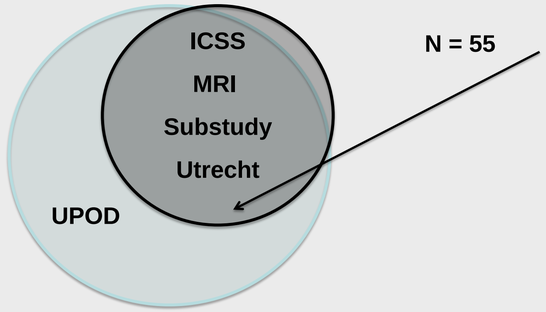
Perioperative stroke / DWI-lesions

Little known about the effect of subtle changes in perioperative blood pressure on outcome

PURPOSE

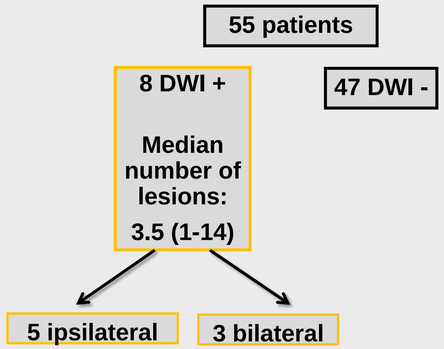
To investigate the relation between intraoperative hypotension and new postprocedural DWI lesion in patients undergoing CEA

METHODS



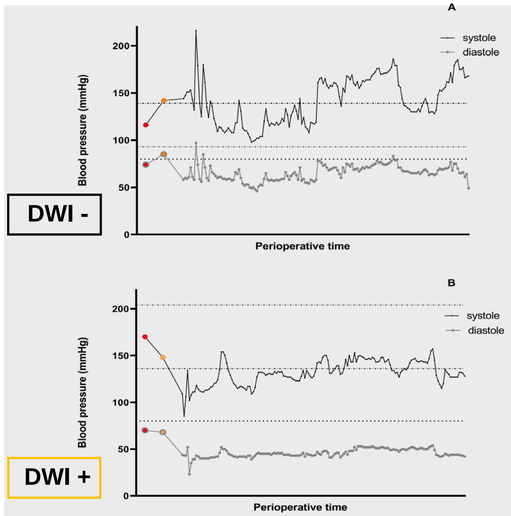
- **Pre- and postprocedural MRI**
- **Perioperative BP registration**

RESULTS



	DWI -	DWI +	*p*-Value
Hypertension *n (%)*	34 (72.3)	5 (62.5)	.571
Systolic BP_{preop} ***Mean (SD)***	**158 (27)**	**186 (31)**	**.010**
Diastolic Bp_{preop} ***Mean (SD)***	**84 (13)**	**95 (15)**	**.045**
Mean systolic $BP_{intraop}$, mmHg *Mean (SD)*	145 (15)	149 (20)	.399
Mean diastolic $Bp_{intraop}$ mmHg, *mean (SD)*	62 (8)	66 (10)	.655
Systolic $BP_{intraop}$ < 80 mmHg, Minutes, *median (range)*	0 (0 – 7)	0 (0 – 0)	.224
Systolic $BP_{intraop}$ decrease ≥20% of BP_{preop}, Minutes, *median (range)*	32 (0 – 174)	69 (15 – 140)	.088
Mean systolic $BP_{intraop}$ – systolic Bp_{preop} **mmHg, *mean (SD)***	**-14 (26)**	**-37 (29)**	**.024**

RESULTS



- **No difference in intraoperative BP between DWI+ and DWI- patients**
- **DWI+ patients have higher preoperative and lower ***relative*** intraoperative BP compared to DWI- patients**

CONCLUSION

Preoperative hypertension and relative intraoperative hypotension

➔ Possible risk factor for cerebral ischemia

➔ In need for more research on optimal perioperative BP management

DISCLOSURES

None

[1] Rots et al. Predictors of New Ischaemic Brain Lesions on Diffusion Weighted Imaging After Carotid Stenting and Endarterectomy; A systematic review. Eur J Vasc Endovasc Surg. 2019

[2] Gensicke et al. Ischemic brain lesions after carotid artery stenting increase future cerebrovascular risk. J Am Coll Cardiol. 2015.