PERCEIVED VERSUS ACTUAL PREVALENCE OF SYMPTOMATIC CAROTID NEAR-OCCLUSION

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BACKGROUND

Near-occlusion is often cited to be rare, but without reference. Indeed there has been no study aimed at assessing the prevalence of near-occlusion. Since near-occlusion is often overlooked when CTA is assessed in routine practice[1] and ultrasound has a very low sensitivity for near-occlusion[2], it seems reasonable to suspect a mismatch between perceived and actual prevalence of near-occlusion.

The aim of this study was to determine actual and perceived prevalence of symptomatic near-occlusion among symptomatic ≥50% carotid stenosis.

METHODS

One CTA-expert manually re-reviewed 4403 consecutive CTA performed for all indications. Another CTA-expert audited all possible near-occlusion cases. Exams with ultrasound alone were found by several local database searches.

Only cases with symptomatic ≥50% carotid stenosis were analyzed. Actual prevalence was determined by CTA review. Perceived diagnosis by the clinician was used to calculate perceived prevalence. Perceived diagnosis and causes for missed diagnoses were determined by review of medical records and imaging reports, blinded to CTA-findings.

Near-occlusion diagnosis was set by CTA review: Systematic interpretation to assess if the internal carotid artery (ICA) distal to the stenosis was small and most likely reduced in size by the stenosis[3]. Assessments were based on ICA asymmetry, ICA size, ICA/external carotid artery (ECA) ratio and stenosis severity[3]. Subtle collapses were acknowledged (near-occlusion without full collapse) in addition to severe collapses (near-occlusion with full collapse, "string sign"). The common near-occlusion mimic of ICA asymmetry caused by anatomical variance in the Circle of Willis was categorized as conventional stenosis[4].

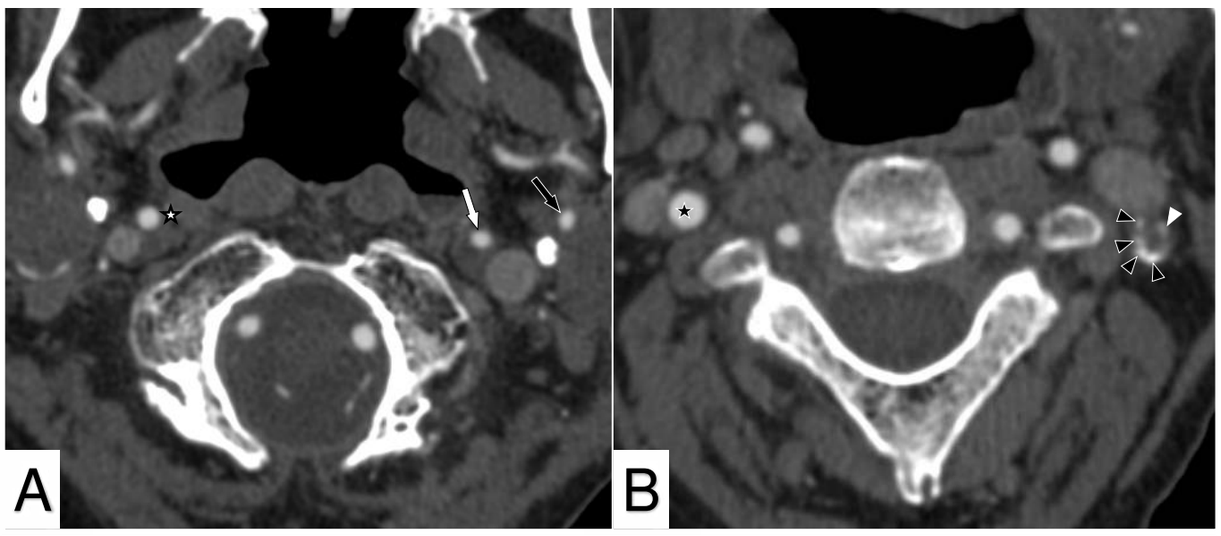
RESULTS

533 patients with symptomatic ≥50% stenosis on CTA or ultrasound were included; 72% were examined with CTA (+/- ultrasound) and 28% with ultrasound alone. 105 cases of near-occlusion was seen on CTA. The prevalence of near-occlusion on CTA was 27% (95%CI 22-31%). The perceived prevalence was 4.5% (95%CI 2.8-6.3%; bar chart).

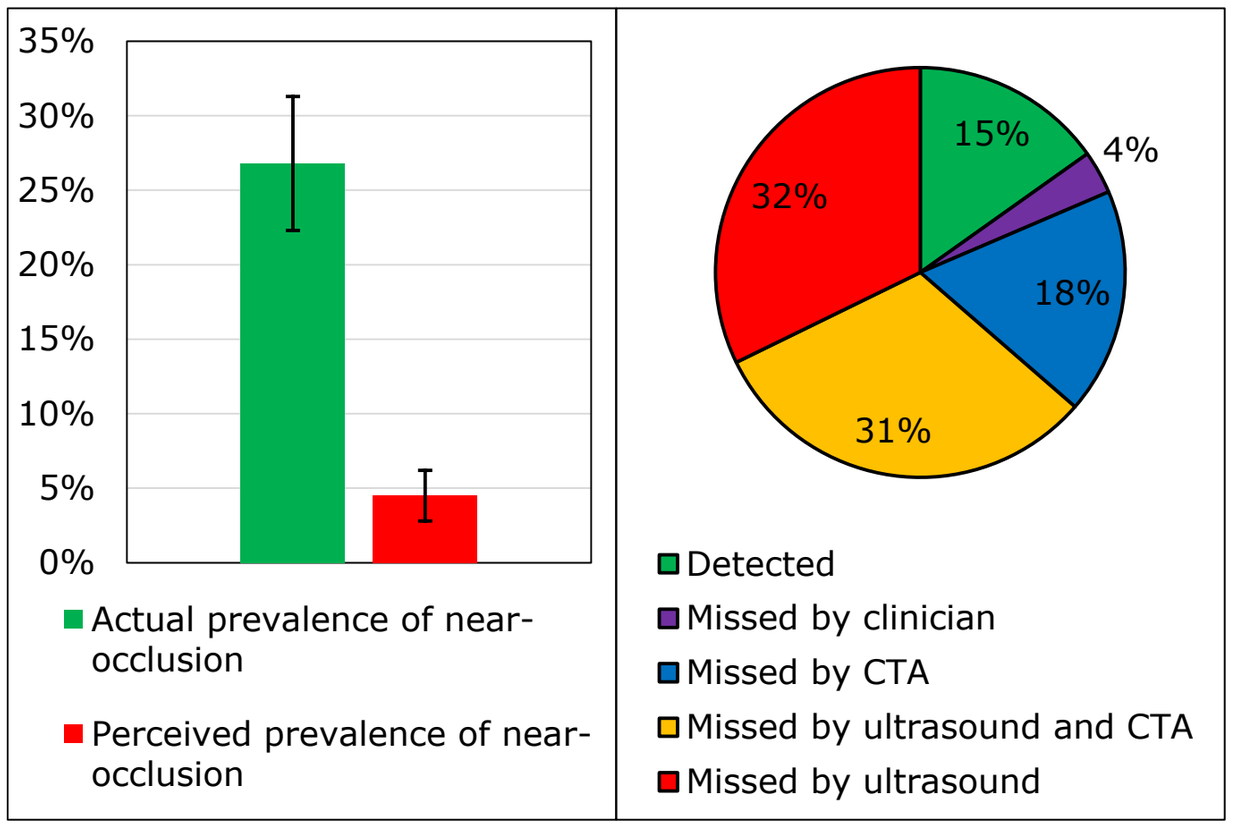
3 near-occlusions were detected among those examined with ultrasound alone; assuming the same near-occlusion prevalence (27%) as for those examined with CTA, 37 near-occlusions were assumed to be missed due to use of ultrasound alone. Of the total 145 near-occlusions, only 15% were detected (pie chart).

BASIC FACTS ABOUT NEAR-OCCLUSION

- Near-occlusion is severe stenosis causing distal artery size reduction
- Near-occlusion is an angiography diagnosis
- Near-occlusion is likely caused by flow reduction
- Near-occlusion includes more than "string sign" – the distal collapse is often subtle
- Major trial findings for 50-99% stenoses are not applicable to near-occlusion.
- In guidelines, symptomatic near-occlusion does not have a strong indication for CEA/CAS



Left-sided near-occlusion. A) Axial view distal to the stenosis. B) Axial view of stenosis. Distal ICA (white arrow) is small, smaller than right ICA (White star) and similar as left ECA (Black arrow). The left-sided stenosis is severe (White arrowhead), a calcified stenosis (black arrowheads). No relevant stenosis on right side (black star). CTA was misclassified as conventional stenosis when interpreted in routine practice and by ultrasound due to a stenosis PSV of 370 cm/s.



CONCLUSIONS

1) **Symptomatic near-occlusion is common among symptomatic ≥50% carotid stenosis.**

2) **Ultrasound use and poor CTA interpretation are main causes why near-occlusion is perceived to be rare.**

REFERENCES

1) Johansson et al. Carotid near-occlusion is often overlooked when CTA is reviewed in routine practice. Poster on ESOC 2019
2) Johansson et al. Carotid ultrasound has a very low sensitivity for near-occlusion. Poster on ESOC 2019
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4) Johansson E, Fox AJ. Neuroradiol. 2017;59:319-321.

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