Angiotensin-converting enzyme inhibitor

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An angiotensin-converting enzyme inhibitor (ACE inhibitor) is a pharmaceutical drug used primarily for the treatment of hypertension (elevated blood pressure) and congestive heart failure.

This group of drugs causes relaxation of blood vessels as well as a decrease in blood volume, which leads to lower blood pressure and decreased oxygen demand from the heart. They inhibit the angiotensin-converting enzyme, an important component of the renin-angiotensin system.

Frequently prescribed ACE inhibitors include benazepril, zofenopril, perindopril, trandolapril, captopril, enalapril, lisinopril, and ramipril.

Enalaprilat is the active metabolite of enalapril. It is the first dicarboxylate-containing angiotensin-converting enzyme inhibitor and was developed partly to overcome these limitations of captopril.

This study investigates risk factors for BFR after AC, including medical conditions and antihypertensive drug therapies, with a focus on angiotensin-converting enzyme inhibitors (ACEIs), which have been associated with a beneficial effect on bone healing and bone preservation in orthopedic, osteoporosis, and endocrinology research.METHODSIn this single-center, retrospective study 183 consecutive cases were evaluated for bone flap resorption after AC. Information on patient demographics, medical conditions, antihypertensive therapy, and BFR-defined as an indication for revision surgery established by a neurosurgeon based on clinical or radiographic assessments-was collected. A Kaplan-Meier analysis of time from AC to diagnosis of BFR was performed, and factors associated with BFR were investigated using the log-rank test and Cox regression.RESULTSA total of 158 patients were considered eligible for inclusion in the data analysis. The median follow-up time for this group was 2.2 years (95% CI 1.9-2.5 years). BFR occurred in 47 patients (29.7%), with a median time to event of 3.7 years (95% CI 3.3-4.1 years). An ACEI prescription was recorded in 57 cases (36.1%). Univariate Kaplan-Meier analysis and the log-rank test revealed that ACEI therapy (2-year event free probability [EFP] 83.8% ± 6.1% standard error vs 63.9% ± 5.6%, p = 0.02) and ventriculoperitoneal (VP) shunt treatment (2-year EFP 86.9% ± 7.1% vs 66% ± 5.0%, p = 0.024) were

associated with a lower probability of BFR. Multiple Cox regression analysis showed ACEI therapy (HR 0.29, p = 0.012), VP shunt treatment (HR 0.278, p = 0.009), and male sex (HR 0.500, p = 0.040) to be associated with a lower risk for BFR, whereas bone fragmentation (HR 1.92, p = 0.031) was associated with a higher risk for BFR.CONCLUSIONSHypertensive patients treated with ACEIs demonstrate a lower rate of BFR than patients treated with other hypertensive medications and nonhypertensive patients. Our results are in line with previous reports on the positive influence of ACEIs on bone healing and preservation. Further analysis of the association between ACEI treatment and BFR development is needed and will be evaluated in a multicenter prospective trial [1)].

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Schütz A, Murek M, Stieglitz LH, Bernasconi C, Vulcu S, Beck J, Raabe A, Schucht P. ACE-inhibitors: a preventive measure for bone flap resorption after autologous cranioplasty? J Neurosurg. 2018 Nov 1:1-8. doi: 10.3171/2018.6.JNS172605. [Epub ahead of print] PubMed PMID: 30497161.