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Prediction of the pterygopalatine ganglion localization in CT images

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Background
The pterygopalatine ganglion (PPG) is a target for several headache syndromes. Most of the groups targeting the PPG do not localize it before injection and this might account for some therapeutic failures. The PPG cannot be seen in CT scans but one has to use MRI to localize it. It would be advantageous to be able to predict its localization in CT scans if MRI is not accessible or contraindicated and for those using fluoroscopy and CT-guided injections.

Methods
We localized the PPG in 21 Caucasian patients (21 right and 17 left ganglia; total 38) in 3T-MR images subsequently fused with CT scans. Two approaches were used to predict the position of the PPG. In the first, the coordinates of the opening of the Vidian canal (VC) and the distances to the PPG were measured in 38 sides. The average distance between VC and PPG was used to predict in CT images the first estimated localization of the PPG (PPG*). In the second approach, the coordinates (in MRIs) of the closest point to the PPG in the pterygopalatine bone, were registered (S-point). The average distance from the S-point to the PPG was calculated. This average distance, was used to calculate the coordinates of the second prediction of the PPG in CT images (PPG**) from the S-point. Finally, the distance between the PPG, as seen in MRIs, and predicted PPG*/ PPG** was calculated.

Results
The average distance between PPG, as located in MRI-images, and PPG* (estimated in CT images, calculated from the average distance from the VC) was 1.82 mm (SD: 0.83). The average distance between PPG, as located in MRI-images, and PPG** (estimated in CT-images, calculated from the average distance from the closest point on the sphenoidal bone) was 2.09 mm (SD: 0.99).

Conclusions
The localization of the PPG can be accurately predicted in CT images using bony landmarks in these sample of patients.

Key words: pterygopalatine ganglion, sphenopalatine ganglion, headache, CT scan and MRIs.