The predictive value of infraorbital nerve enlargement in detecting IgG4-related orbital disease

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Background: Although the association of IgG4-Related orbital disease (IgG4-ROD) with infraorbital nerve enlargement (IONE)has been reported as potentially useful to differentiate IgG4-ROD from other forms of orbital inflammation, no normative data on infraorbital nerve diameter is available and hence the criteria of IONE is not well established. This study aims to elucidate the normative infraorbital nerve size in orbital computed tomography (CT) scans in order to propose a cut-off value for defining IONE in the South-east Asia population.
Methods: Retrospective case controlled review of a total of 181 thin-slice (3mm) CT images was per formed. 76 CT scans were performed for unilateral facial fracture or blunt trauma (normal, non-inflammatory controls), and 37 scans for severe thyroid eye disease (TED) requiring orbital decompression (inflammatory controls) were analysed with 67 CT scans performed in cases of biopsy-proven orbital inflammation. The diameter of the infraorbital nerve was measured in 2 dimensions at the equator and at the first retrobulbar cut.
Results: Infraorbital nerve diameter in normal non-inflammatory controls was 3.54mm (±0.49mm, SD) at the equator of the globe and 3.30mm (±0.64mm, SD) at the first retrobulbar cut. The infraorbital nerve diameter was significantly larger in the IgG4-ROD group compared to both normal non-inflammatory ($p = 0.000$, ANOVA) and TED inflammatory control groups ($p = 0.000$, ANOVA). No statistical difference was detected in the infraorbital nerve diameter between normal, non- inflammatory controls, inflammatory (TED) controls and patients with other inflammation (ANOVA).
Conclusion: This study defines the CT measurements of the normal non-inflammatory infraorbital nerve in our south-east Asian population as 3.30 mm (±0.64mm, SD) at the first retrobulbar cut. Statistical analysis of the infraorbital nerve diameter in IgG4-ROD with other inflammatory disorders and non-inflammatory controls have confirmed IONE as a useful radiological marker for IgG4-ROD.