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## Dural Venous Sinus Gas Predicts a Higher Likelihood of Dural Venous Sinus Thrombosis Following Blunt Head Trauma

Tiffany Y So<sup>1\*</sup>, Andrew Dixon<sup>1</sup>, Helen Kavnoudias<sup>1</sup>, Eldho Paul<sup>2</sup> and William Maclaurin<sup>1</sup>

<sup>1</sup>Department of Radiology, Alfred Hospital, Melbourne, Australia

<sup>2</sup>Department of Epidemiology and Preventive Medicine, Monash University, Australia

**Introduction:** It has not been investigated whether patients with intraluminal sinus gas may have a higher likelihood of DVST in the setting of trauma. We postulate that intrasinus gas seen on radiology studies may be a marker of sinus injury, suggesting an increased risk of sinus thrombosis. The aim of this study was to assess the association between intrasinus gas and dural venous sinus thrombosis (DVST) in patients with blunt head trauma.

**Methods:** One hundred and two consecutive patients with blunt head trauma imaged with non-enhanced CT and CT head venography at our institution between 1 July 2011 and 30 June 2016 were included. Image review was performed by two independent reviewers to assess for the presence of intrasinus or perisinus gas and DVST. Skull fractures involving a dural venous sinus, sinus hyperdensity, extraaxial haematoma, and/or extrinsic dural venous sinus compression were also recorded. Univariate and multivariate analyses estimated the associations between the imaging variables and DVST.

**Results:** Thirty-seven cases of DVST were confirmed with CT venography: 10 (27.0%) occlusive, and 27 (73.0%) non-occlusive. We detected 24 cases of intrasinus gas, all occurring with skull fractures. Gas localized to the sinus involved by the fracture in 23 (95.8%) of 24 cases. Additional gas within a contiguous sinus was present in nine (37.5%) cases. The association between intrasinus gas and DVST of the respective sinus was statistically significant (OR: 11.3, CI: 3.9–32.9,  $P < 0.0001$ ). DVST was also significantly associated with the presence of a skull fracture ( $P = 0.04$ ), fractures involving the sigmoid sinus ( $P = 0.0001$ ), and sinus hyperdensity ( $P < 0.0001$ ).

**Conclusion:** Traumatic intrasinus gas is associated with DVST in patients with blunt head trauma. Its detection on non-enhanced CT examinations in the emergency care setting infers a higher risk of DVST and should prompt consideration of CT venography.