Use of Ultrasound in the Diagnosis of Craniosynostosis

Tracks: Craniofacial / Pediatrics
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BACKGROUND

- Craniosynostosis (CS), caused by premature fusion of the sutures between skull bones, is a rare condition in infants that may produce increased intracranial pressure and have related detrimental effects on the growing brain .
- Though clinical diagnosis is possible, confirmation often requires radiologic imaging, historically with XR and CT scans[1].
- Recently, ultrasound has been suggested as a safer, yet sensitive and specific, diagnostic tool for craniosynostosis, although its use in clinical practice is not well characterized[2].
- The authors examined the trends of imaging for the diagnosis of craniosynostosis in a children's hospital setting and delineate if imaging patterns have changed with newer studies in ultrasound.

METHODS

- The diagnostic pathway for suspected craniosynostosis begins with clinical suspicion of abnormal head shape, followed by clinical evaluation, imaging if clinical evaluation is inconclusive, and potential additional imaging.
- All patients with suspected craniosynostosis diagnosis that required imaging between January 2005 to December 2018 at Mount Sinai Hospital were evaluated.
- Patients were evaluated if the diagnosis was confirmed with initial ultrasound (US) scan or CT scan.
- Furthermore, patients that had additional scans to confirm the diagnosis were also analyzed.

RESULTS

- A total of 40 patients with suspected craniosynostosis underwent US scans as their first imaging modality.
- Out of these patients, 27 did not show signs of craniosynostosis, and 13 had inconclusive studies, where further imaging was not done at the discretion of the provider.
- No patients who initially underwent US had repeat US done.
- Initial CT scan for patients with suspected craniosynostosis was performed in 148 patients.
- 23 were confirmed to have craniosynostosis, 119 did not shows signs of craniosynostosis, and 6 had inconclusive studies.
- Of the 119 CT scans that did not show signs of craniosynostosis, 5 patients had repeat CT scans and all 5 had confirmed no signs of craniosynostosis.
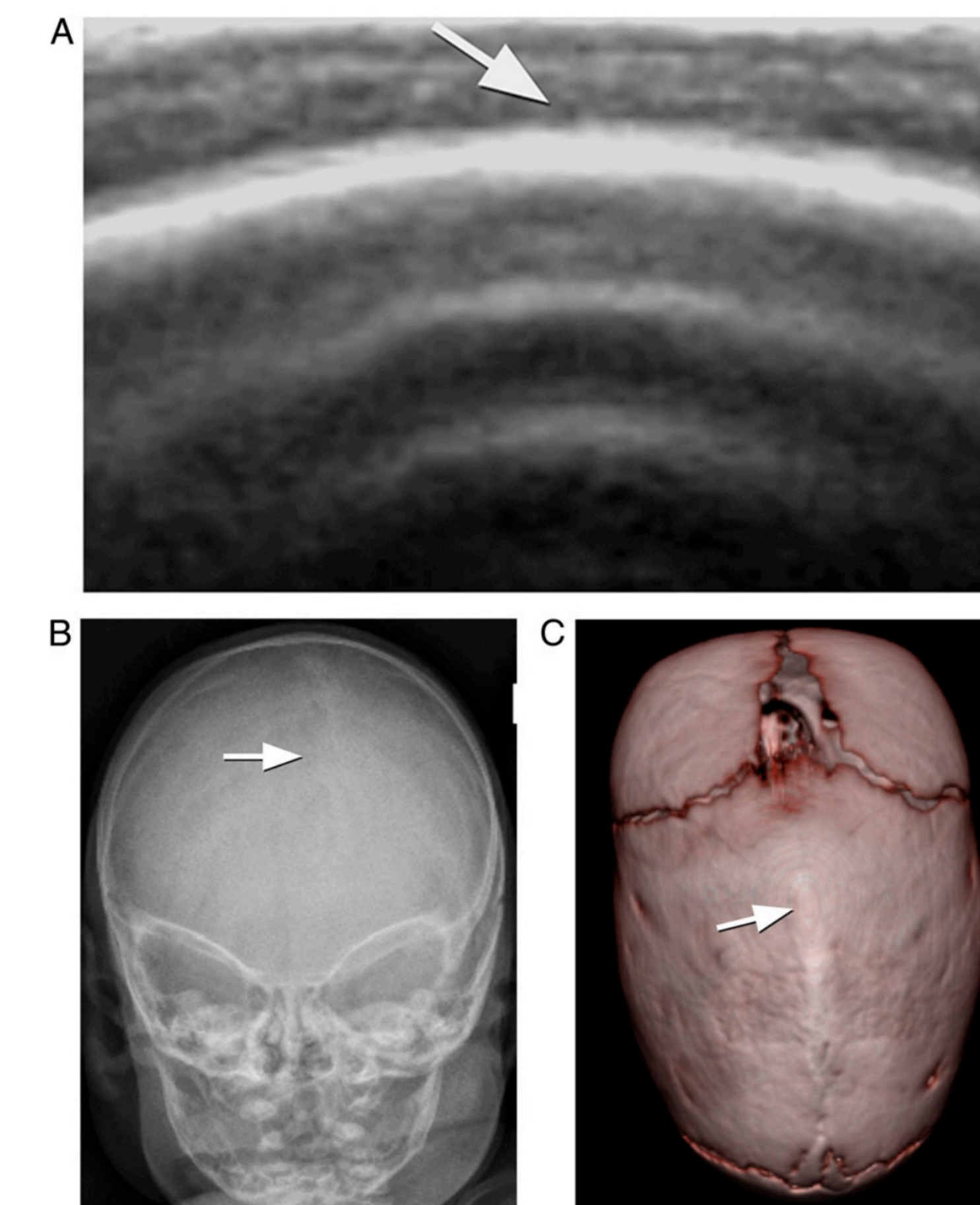
A. Closed sagittal suture on US **B.** Frontal x-ray **C.** CT reconstruction[2]
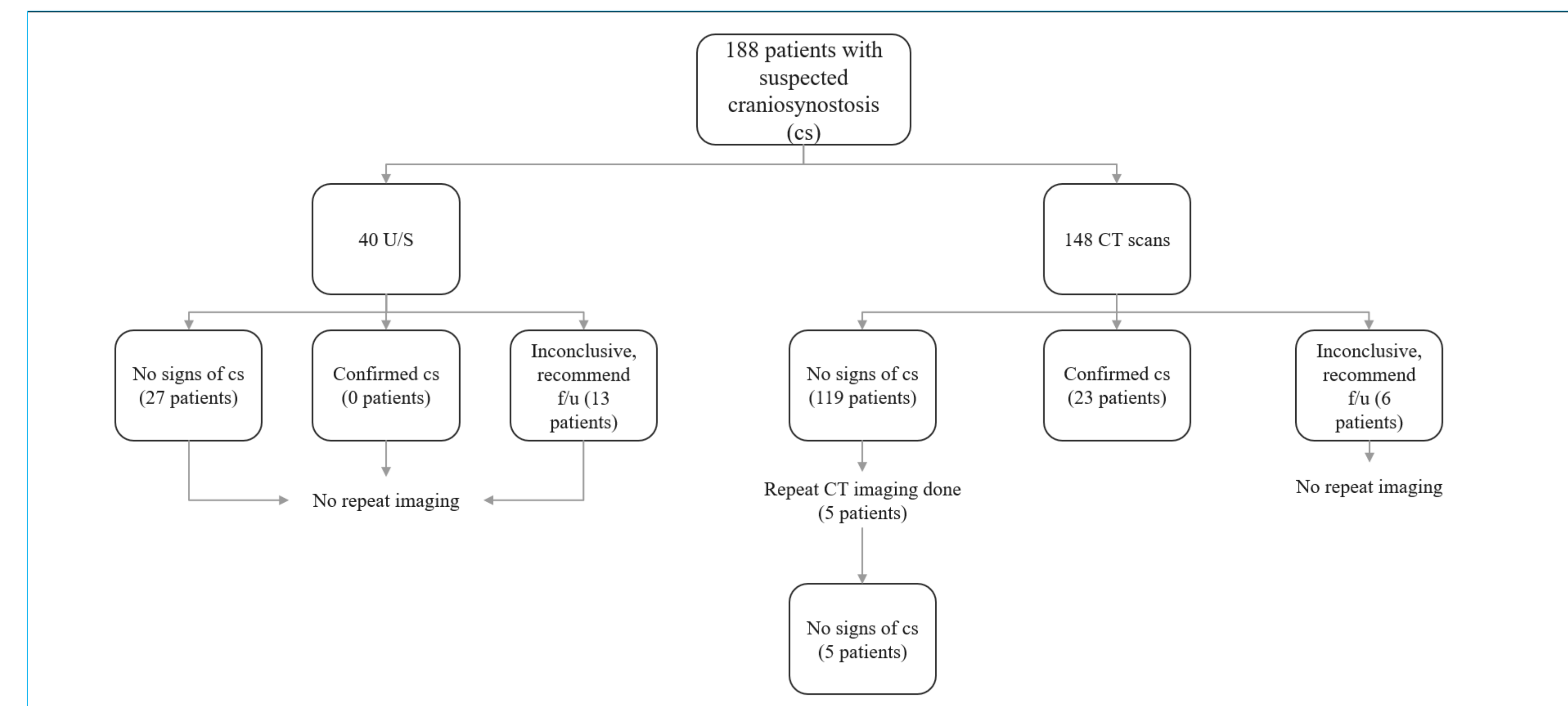
CONCLUSION

- The use of ultrasound as a surrogate imaging study to CT for the diagnosis of craniosynostosis in a clinical setting has rarely been studied.
- The present study shows that, even with evidence of ultrasound as an alternative, many initial scans/diagnoses are made with CT.
- Furthermore, ultrasounds, though effective in ruling out craniosynostosis, often lead to inconclusive reads that require follow-up.
- Physicians maintain a preference for CT imaging as the definitive diagnostic tool for craniosynostosis, and in patients with multiple scans, they remain consistent with the imaging modality that they began with (CT imaging was the modality of choice when repeat imaging was done) – potentially because of preference.
- A potential limitation could be system-implemented protocols that result in repeated imaging modalities, such as CT followed by CT, leaving open the possibility that multiple site studies could show different imaging trends.

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