Evaluating the utility and accuracy of Brainomix e-Stroke software at a district general hospital and how it compares to tertiary thrombectomy centres

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Purpose

Stroke is a leading cause of death and disability in the United Kingdom with 100,000 people being affected annually with one stroke occurring every five minutes.

Brainomix e-Stroke system is an artificial intelligence tool that assists in the detection of middle cerebral artery (MCA) acute ischemic infarcts on CT imaging. After recently adopting the software at our institution, we aim to evaluate the correlation between Brainomix interpretation in comparison to the radiologists' report.

Methods

Retrospective analysis was performed on all CT heads performed with a clinical indication of a suspected acute ischaemic event in a selected period in November 2023. 117 studies (figure 1) were assessed and the Brainomix software outcome was compared to the authorised report issued by the authorising radiologist. Accuracy of the software was calculated based on the Alberta stroke program early CT score (ASPECTS).

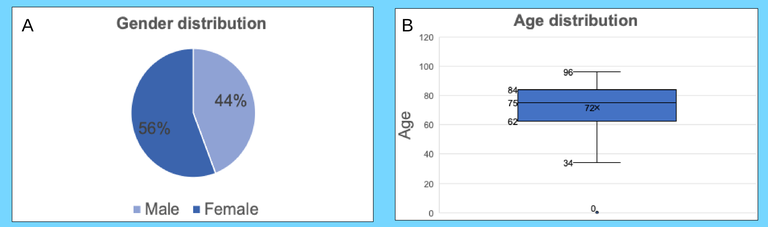


Figure 1: Population demographics. (A) pie chart demonstrating the gender distribution and (B) is a box-and-whisker diagram displaying the age distribution.

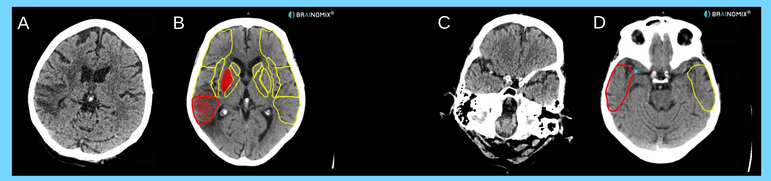


Figure 2: (A) Right MCA territory infarct (B) Brainomix software highlighting the abnormal areas of attenuation in red. (C) Dense right MCA (D) Brainomix outlining the dense vessel in blue.

		Authorising radiologist		
		Infarct	No infarct	
Brainomix	Infarct	6	25	PPV 19%
	No infarct	1	88	NPV 99%
		Sensitivity 86%	Specificity 78%	Accuracy 78%

Figure 3: Statistical analysis of the data demonstrating sensitivity, specificity, positive predictive value and negative predictive value

Results

Brainomix had an accuracy of 78% in calculating ASPECTS with a sensitivity of 86% and a specificity of 78%. The positive predictive value was 14% with a negative predictive value of 99% (figure 3).

In terms of detecting a hyperdense vessel (figure 2), the software accuracy reached 91.6% with a specificity of 92.4% and a false positive rate of 7.5%. Acute haemorrhage detection had a sensitivity of 100%.

Conclusion

The Brainomix e-Stroke allows the rapid transfer of images between district general hospitals and thrombectomy centres which results in optimised patient care.

The software accuracy in our centre is roughly similar to those reported in the literature from other centres. We recommend continuous interrogation of the results of Brainomix by radiologists during reporting.

References

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