The “Spot Sign”: A predictor of hematoma expansion

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INTRODUCTION

In this poster, we show the utility of the CT Angiogram (CTA) “Spot sign” as a predictor of intracranial hematoma expansion and subsequent neurologic decline, and demonstrate the measures we utilized to decrease the morbidity and mortality of the patient in this case report. We discuss the hospital course of a 69-year-old male who presented with hypertensive emergency and focal neurologic deficits and was found to have a large basal ganglia hypertensive bleed with “Spot sign” present on CTA head and neck with and without contrast. Patient was treated very aggressively and was given hypertonic solutions due to the team’s quick recognition of the “Spot sign” signaling potential for future hematoma expansion. Though as predicted by the “Spot sign”, his bleed did expand, the patient survived with our aggressive measures at the onset of bleed.

BACKGROUND

The “Spot sign” is a radiographic sign that can be found on a CTA study and represents a spot of active extraluminal extravasation and accumulation of contrast dye within an intracerebral hemorrhage (1, 2). Theoretically, the sign has been seen in shape as linear, branching or spherical (3). When this sign is identified on imaging, it indicates an increased likelihood of significant increase in size of hematoma expansion, as this sign is an independent predictor of growth and poor outcomes (4). Meta-analysis studies have shown that, "for each 10% increase in hematoma volume, patients were 5% more likely to die and 16% more likely to increase one point on the modified rankin scale" (5). However, if identified correctly the “Spot sign” can be utilized to identify patients who are most likely to benefit from medical and surgical therapy for rapid expansion of intracranial hematoma (6, 7). The “Spot sign” serves as a predictor for possible hematoma expansion and warrants close neurologic monitoring.

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CASE PRESENTATION

This is a 68-year-old right-handed Caucasian male with no known prior medical history other than alcohol abuse who presented secondary to a sudden onset of left sided weakness while sitting on a barstool. Patient fell to the ground, did not lose consciousness, and came in for potential large vessel occlusion. On the initial stat CT head without contrast, the patient was noted to have a large right supra-tentorial 6.4 x 3.1 cm hemorrhage (Image A). On arrival, the patient was noted to be hypertensive with systolic blood pressure as high as 195. A CTA head and neck with and without contrast was ordered which demonstrated that he did not have evidence of vascular malformation but did have evidence of large blush of contrast within the hematoma consistent with active hemorrhage (Image B). At this time the patient was started on hypertonic solutions in the form of 3% hypertonic saline in an urgent fashion. Repeat CT head demonstrated a mild interval increase in the size of the right basal ganglia hemorrhage with intraventricular extension (Image C). With serial CT head imaging without contrast, the hemorrhage remained stable, and the hypertonic saline was eventually discontinued. His hospital course was complicated by delirium tremens in the setting of daily alcoholism, for which he was also treated for and subsequently required intubation and eventual peg and trach placement. Further neurologic workup including EEGs were unremarkable for epileptiform discharges. He continued to remain stable from a neurological standpoint. Patient was able to be discharged from the hospital to a long-term acute care facility with clear instructions for repeat CT head imaging to be done as an outpatient.

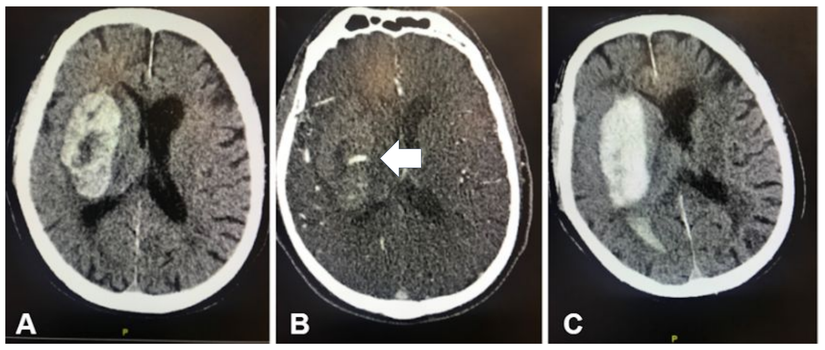

Image A. Initial CT head without contrast demonstrating right basal ganglia hemorrhage

Image B. The initial CTA head and neck with contrast demonstrating large blush of contrast within the hematoma

Image C. Repeat CT head without contrast demonstrating worsening of right basal ganglia hematoma with interventricular extension

DISCUSSION/CONCLUSION

The CTA “Spot sign” in intracranial hemorrhage has been shown to be a reliable imaging sign for determining hematoma expansion (8). This sign is an important predictor for pending neurologic decline secondary to hemorrhagic expansion and is an indicator for patients who may have improved outcomes with aggressive and immediate interventions to avoid significant morbidity and mortality (4). One such intervention is for craniotomy with hematoma removal which can lead to an improved prognosis in “Spot sign” positive patients (9).

It is important to recognize patients with intracranial hemorrhage and have CTA performed as soon as possible as it has been shown that the longer it takes for the patient to get the CTA, the more the positive predictive value of the “Spot sign” decreases (10). In fact, CTA followed by 90 second delayed post-contrast CT, also known as a “delayed CTA”, is a further predictor of the amount of hematoma expansion based on the amount of contrast extravasation, showing that the “Spot sign” can measure active bleeding in these patients which can help better select patients who may see a benefit from additional therapies (6, 7). There is also importance to the timing of the CTA, as when the “Spot sign” was seen arterial and therefore earlier in the imaging, there was greater expansion of the hemorrhage while the later or venous images improved the detection of “Spot signs” (11).

We present the importance of recognizing the “Spot sign” to help alert clinicians to the utility of this important diagnostic tool. This is a clear sign of impending hematoma expansion and prompt recognition is required to guide prognosis and management to decrease the morbidity and mortality otherwise expected from a rapidly expanding bleed. In our presented case, the quick actions of the team in recognizing the “Spot sign” and beginning 3% hypertonic saline early led to only mild interval increase in the size of the right basal ganglia hemorrhage with some intraventricular extension as opposed to the catastrophic possibilities that the “Spot sign” signifies.

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