HYPERFINE®

Swoop® Portable MR Imaging® System

Point-of-Care Imaging in Neurocritical Care Settings

The *Swoop® Portable MR Imaging®* system:

Produces images at the point of care, without transport.

Improves critical care neuroimaging workflow[3,5].

Enables rapid diagnoses and treatment of patients[4,7].

The Swoop Portable MR Imaging system is indicated for use as a bedside magnetic resonance imaging device for producing internal images that display the internal structure of the head when full diagnostic examination is not clinically practical. When interpreted by a trained physician, these images can provide information that can be useful in determining a diagnosis.

Ultimately sequence choice and plane selection decisions should be made with the clinical and radiology teams in consultation together, and should be selected based on the clinical question to be answered. Below are example use cases and the sequences physicians have found useful in their examinations for producing images that provided information relevant to the clinical questions listed. This information is meant to be a reference only.

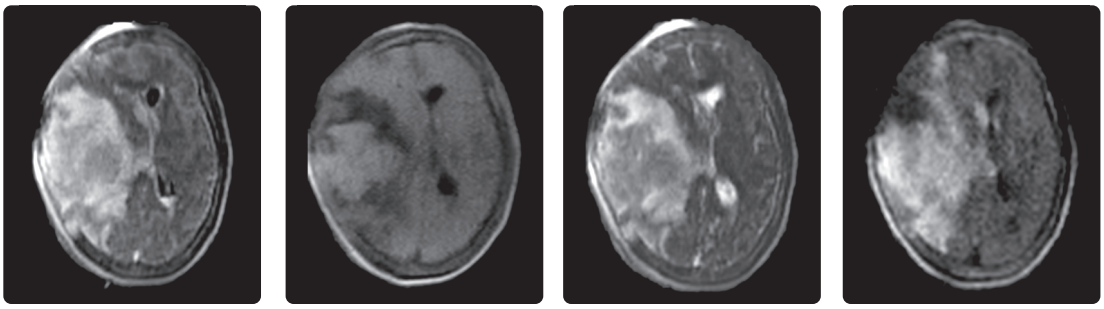
Examples use cases:

Post-operative Trauma Follow-up Assessment

Recommended Sequences: Run based on which sequence(s) the pathology has been previously best seen.

Patient History: A 35-year-old female found unresponsive was brought into the emergency room. An emergent head CT revealed a massive traumatic intraparenchymal hemorrhage. Clinicians immediately took the patient to the operating room for decompression.

Diagnosis: Post-operatively, physicians used the *Swoop* system at the patient's bedside. The images assisted them in assessing the extent of mass effect, midline shift, and tissue viability for prognostication.



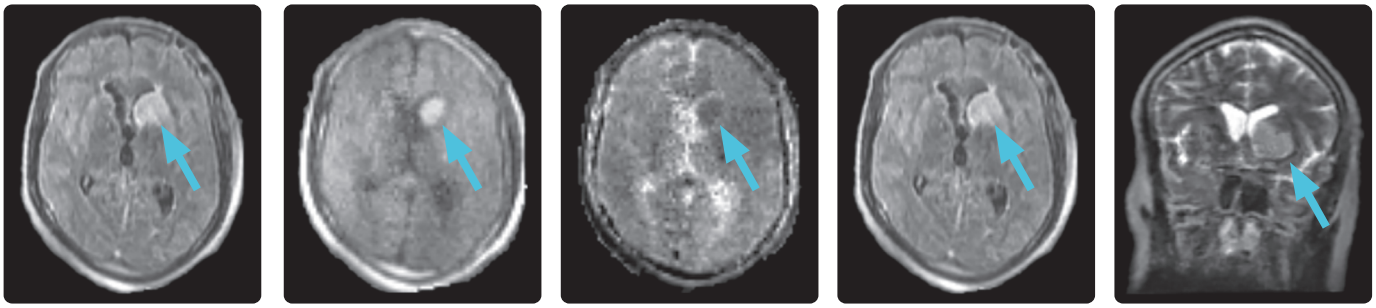
FLAIR | T1 (Standard) | Fast T2 | DWI

Post-op Infarct

Recommended Sequences (in order): FLAIR, DWI with ADC, T1 (Standard), Fast T2

Patient History: A 56-year-old male with a history of prior transsphenoidal pituitary resection recently underwent a pterional approach for additional resection. On post-op day one, the patient experienced a seizure and coded, presenting with new neurological signs, including right-sided weakness and a non-responsive pupil.

Diagnosis: *Swoop* system images assisted the physicians in promptly diagnosing this unstable, immediate post-operative patient.



FLAIR | DWI | ADC | T1 (Standard) | T2

The Swoop system is not intended to apply color overlays to images. Colors are added for clarity and are not reflective of the original images.

Studies show that clinicians can use the *Swoop* system at the point of care for assessing:
Change in patient symptoms with an unknown cause[1,2,3,4], follow-up scans for clinically suspected or known strokes greater than 5mm[5], change in ventricular size with or without intervention[2,6], change in an intraparenchymal hematoma[5], change in extra-axial collection[6], change in the imaging appearance of infarct[3], to follow or confirm stability[7], and mass effect and potential for midline shift[8].

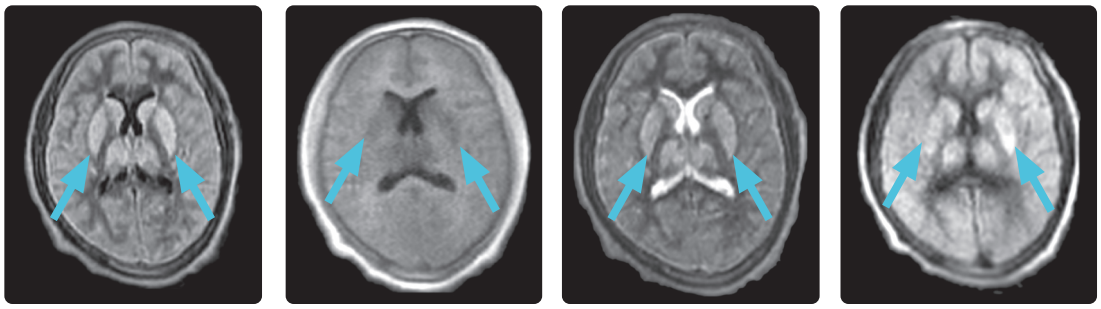
Examples use cases:

Post-cardiac Arrest Anoxia

Recommended Sequences: Run based on which sequence(s) the pathology has been previously best seen.

Patient History: A 31-year-old man, post-drug overdose, presented in the ED and experienced cardiac arrest. Physicians administered naloxone for opioid reversal. Critically ill and unresponsive, having undergone prolonged resuscitation, the patient was transferred to the ICU.

Diagnosis: *Swoop* system images, taken after five days, assisted the physicians in identifying cerebral anoxia and sub-acute infarcts in the deep gray matter of the dorsal midbrain, bilateral thalami, and basal ganglia, guiding the decision to withdraw life support.



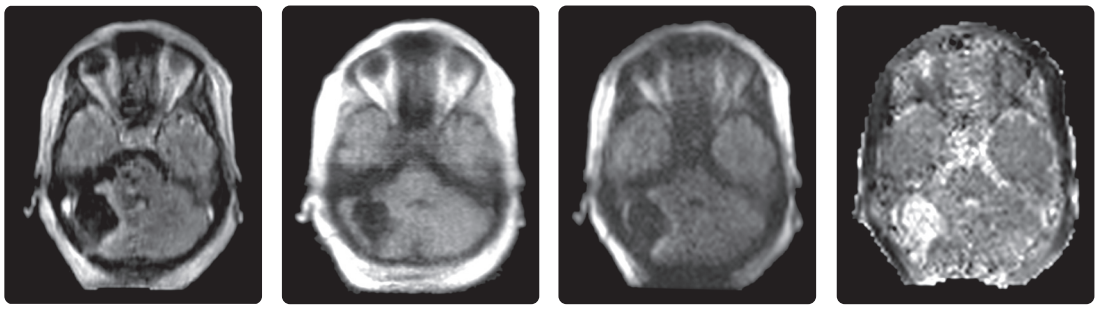
FLAIR | T1 (Standard) | Fast T2 | DWI

Post-operative ICU Exam

Recommended Sequences: Run based on which sequence(s) the pathology has been previously best seen.

Patient History: A 39-year-old female with a history of recurrent metastatic non-small cell lung carcinoma. She now presents with a growing right-sided posterior fossa mass. Physicians used the *Swoop* system in the ICU twelve hours after surgery to assess her condition.

Diagnosis: *Swoop* system images showed a total resection with no evidence of hemorrhage, significant edema, mass effect, or obstructive hydrocephalus. Following the exam, physicians transferred the patient out of the ICU on postoperative day one, saving time and cost.



FLAIR | T1 (Standard) | DWI | ADC

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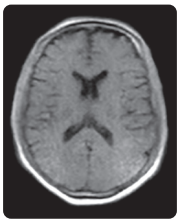
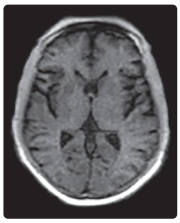
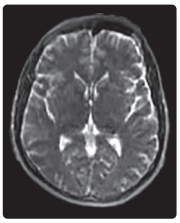
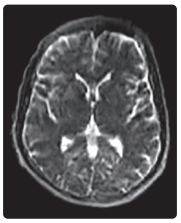
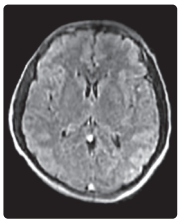
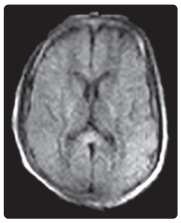
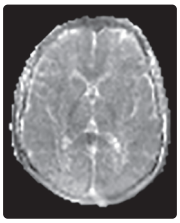
Swoop System Sequences

The *Swoop* system offers T1, T2, fluid-attenuated inversion recovery (FLAIR), and diffusion-weighted imaging (DWI) with apparent diffusion coefficient (ADC) map sequences (with two T1 and T2 variations). The T1, T2, and FLAIR sequences are available in the axial, coronal, and sagittal planes.

T1 (Standard)	T1 (Gray/White)	T2	Fast T2	FLAIR	DWI (with ADC Map)	
						
1.6 × 1.6 × 5 mm	1.6 × 1.6 × 5 mm	1.5 × 1.5 × 5 mm	1.6 × 1.6 × 5 mm	1.6 × 1.6 × 5 mm	2.4 × 2.4 × 6 mm	2.4 × 2.4 × 6 mm

Endnotes

1 Sheth KN, Mazurek MH, Yuen MM, et al. Assessment of Brain Injury Using Portable, Low-Field Magnetic Resonance Imaging at the Bedside of Critically Ill Patients [published online ahead of print, 2020 Sep 8]. *JAMA Neurol.* 2020;78(1):41-47. doi:10.1001/jamaneurol.2020.3263

2 Beekman R, Crawford A, Mazurek MH, et al. Bedside monitoring of hypoxic ischemic brain injury using low-field, portable brain magnetic resonance imaging after cardiac arrest. *Resuscitation.* 2022;176:150-158. doi:10.1016/j.resuscitation.2022.05.002

3 Kuoy E, Glavis-Bloom J, Hovis G, et al. Point-of-Care Brain MRI: Preliminary Results from a Single-Center Retrospective Study [published online ahead of print, 2022 Aug 2]. *Radiology.* 2022;211721. doi:10.1148/radiol.211721

4 Turpin J, Unadkat P, Thomas J, et al. Portable Magnetic Resonance Imaging for ICU Patients. *Crit Care Explor.* 2020;2(12):e0306. Published 2020 Dec 21. doi:10.1097/CCE.0000000000000306

5 Mazurek MH, Cahn BA, Yuen MM, et al. Portable, bedside, low-field magnetic resonance imaging for evaluation of intracerebral hemorrhage. *Nat Commun.* 2021;12(1):5119. Published 2021 Aug 25. doi:10.1038/s41467-021-25441-6

6 Sien ME, Robinson AL, Hu HH, et al. Feasibility of and experience using a portable MRI scanner in the neonatal intensive care unit [published online ahead of print, 2022 Jul 4]. *Arch Dis Child Fetal Neonatal Ed.* 2022;fetalneonatal-2022-324200. doi:10.1136/archdischild-2022-324200

7 Yuen MM, Prabhat AM, Mazurek MH, et al. Portable, low-field magnetic resonance imaging enables highly accessible and dynamic bedside evaluation of ischemic stroke. Sci Adv. 2022;8(16):eabm3952. doi:10.1126/sciadv.abm3952

8 Sheth KN, Yuen MM, Mazurek MH, et al. Bedside detection of intracranial midline shift using portable magnetic resonance imaging. *Sci Rep.* 2022;12(1):67. Published 2022 Jan 7. doi:10.1038/s41598-021-03892-7

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