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Mobile Stroke Units: Improving Stroke Care

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Mobile Stroke Units: Improving Stroke Care

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What is a Stroke?

According to the American Heart Association (2025):

- Strokes occur when normal blood circulation to the brain is suddenly interrupted.
- Ischemic stroke occurs when a clot blocks blood flow in a vessel, whereas hemorrhagic stroke occurs when a vessel ruptures and causes bleeding in the brain.
- Lack of oxygen causes rapid brain cell damage & loss of function.

Role of Computed Tomography (CT)

Based on Rollins et al. (2023):

- CT serves as the first imaging test used in most stroke emergencies.
- Produces detailed cross-sectional images that show internal brain structures clearly.

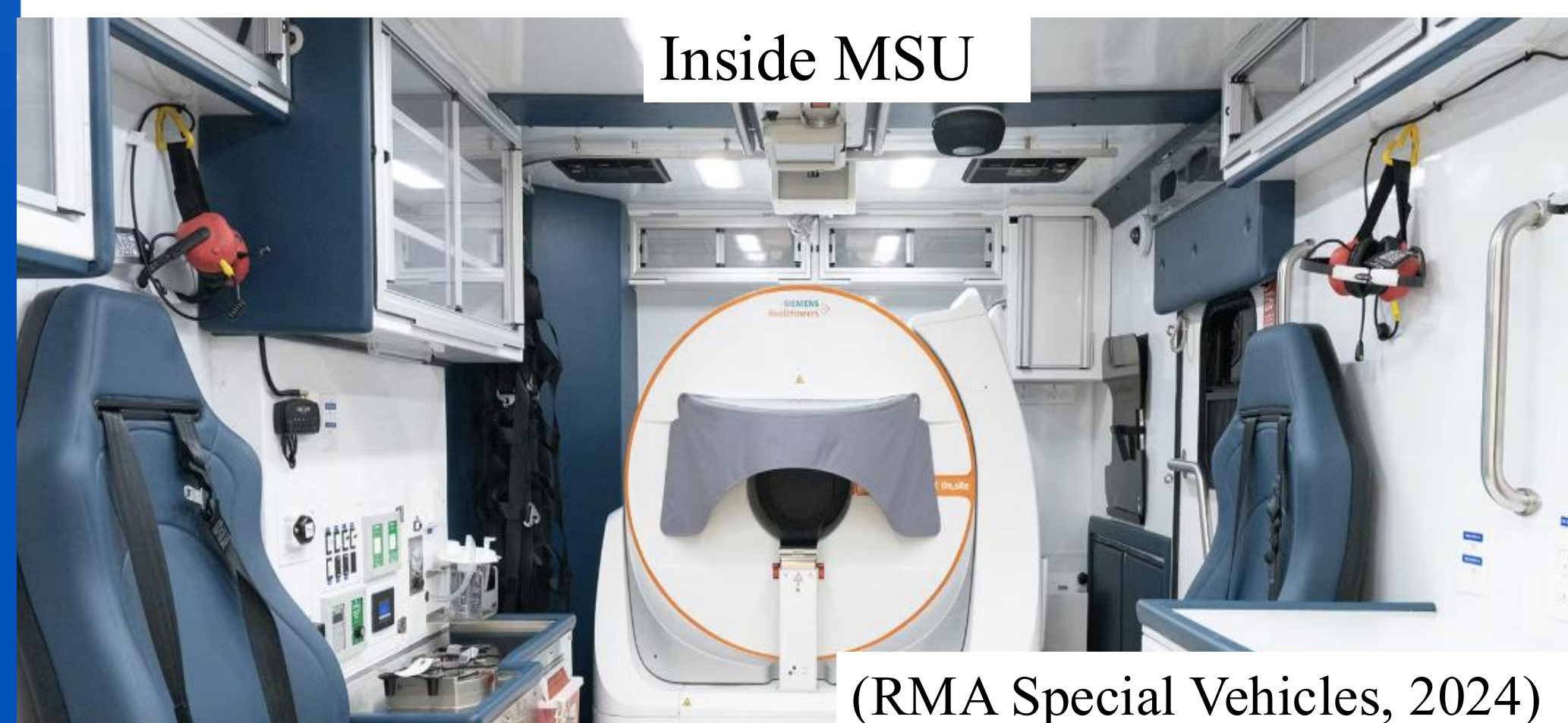
The American Heart Association (2025) indicates:

- CT identifies bleeding, swelling, or tissue damage within minutes.
- Provides fast results, allowing treatment to begin without delay.

Mobile Stroke Units (MSUs)

- Are specialized ambulances equipped with CT scanners
- Include stroke-trained medical personnel.
- Provide imaging directly at the scene.
- Allow rapid patient evaluation in the field.
- Enable real-time neurologist consultation.
- Support immediate clinical decision-making.

(American Heart Association, 2025)



MSU vs Standard Emergency Medical Services (EMS)

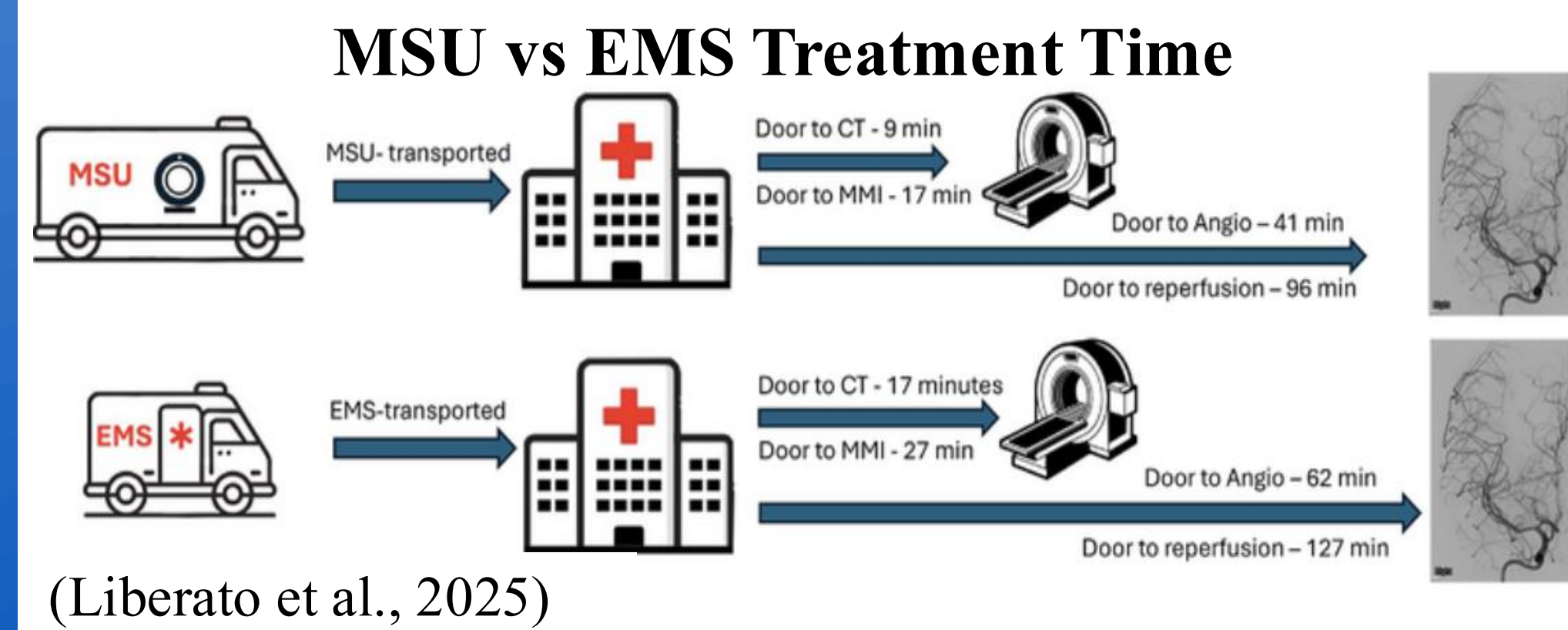
Mobile Stroke Units (MSUs):

- MSUs are specialized ambulances (EMS) designed specifically for emergency stroke care.
- Imaging is performed before hospital arrival, allowing earlier evaluation.
- Stroke type is identified prior to hospital arrival using on-board CT imaging.
- Clinical decisions are made earlier based on immediate imaging results.

- Treatment planning begins sooner before reaching the hospital.

Standard EMS:

- No imaging is performed before hospital arrival.
- Diagnosis occurs only after transport to the hospital.
- Clinical decisions are delayed until imaging is completed.
- Treatment planning starts later in the hospital setting.
- Additional time is required in the emergency department before care begins. (Cleveland Clinic, 2024)



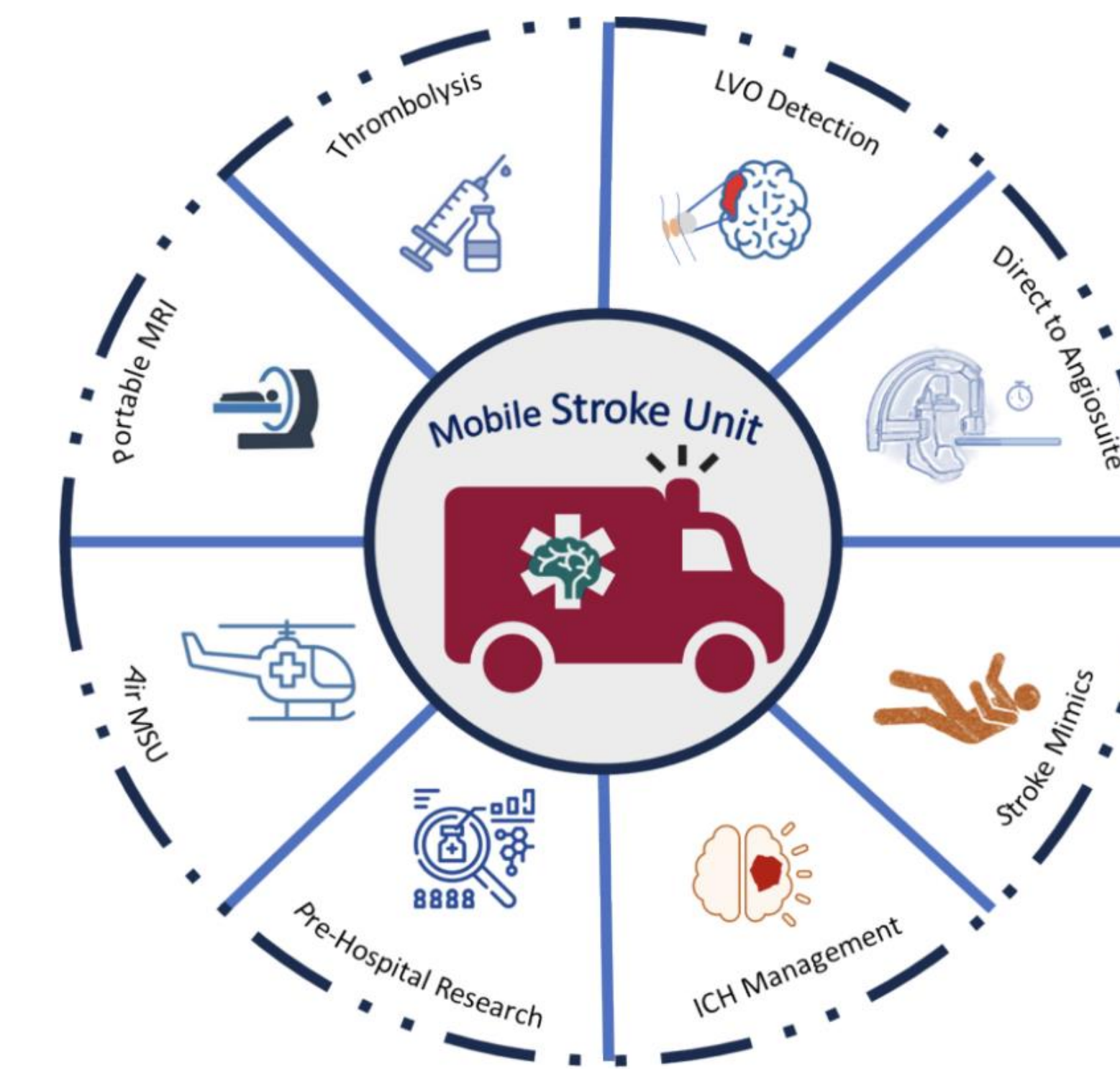
Impact on Patient Care

Ebinger et al. (2021) indicate:

- That earlier diagnosis improves treatment timing by allowing care to begin sooner.
- Faster intervention reduces complications and improves patient stability.

Mac Grory et al. (2024) state:

- Shorter delays limit the amount of brain tissue damage that occurs.
- Supports more accurate treatment selection based on early imaging findings.



(Krothapalli et al., 2024)

MSU Workflow

- An emergency call is received for patients showing stroke symptoms.
- MSU is dispatched rapidly upon patient location.
- CT scan is performed inside the ambulance shortly after arrival.
- Brain images are transmitted to a neurologist for rapid interpretation.
- Treatment decisions made based on imaging results & clinical findings.
- Medication or intervention can begin before reaching the hospital.

(Cleveland Clinic, 2024)

Importance in Emergency Care

The American Heart Association (2024) reports:

- MSUs reduce delays by starting imaging and evaluation at the scene.
- Faster diagnosis improves efficiency by shortening time to decisions.
- Improved EMS and hospital coordination enhances care and patient transfer.
- Structured workflows support faster and more accurate decision-making.
- Early care improves survival and reduces long-term disability.
- Faster intervention increases positive outcomes and recovery.

Future Implications

- MSUs are expected to expand into rural and underserved areas to improve access to stroke care.
- Prehospital imaging is becoming a standard component of emergency response systems.
- Ongoing research continues to refine stroke treatment protocols.
- Advances in telemedicine support faster specialist involvement through remote review.
- Improvements in technology enhance efficiency in emergency stroke workflows.
- Wider MSU use helps standardize early stroke evaluation across healthcare systems.

(Rohmann et al., 2025)

Conclusion

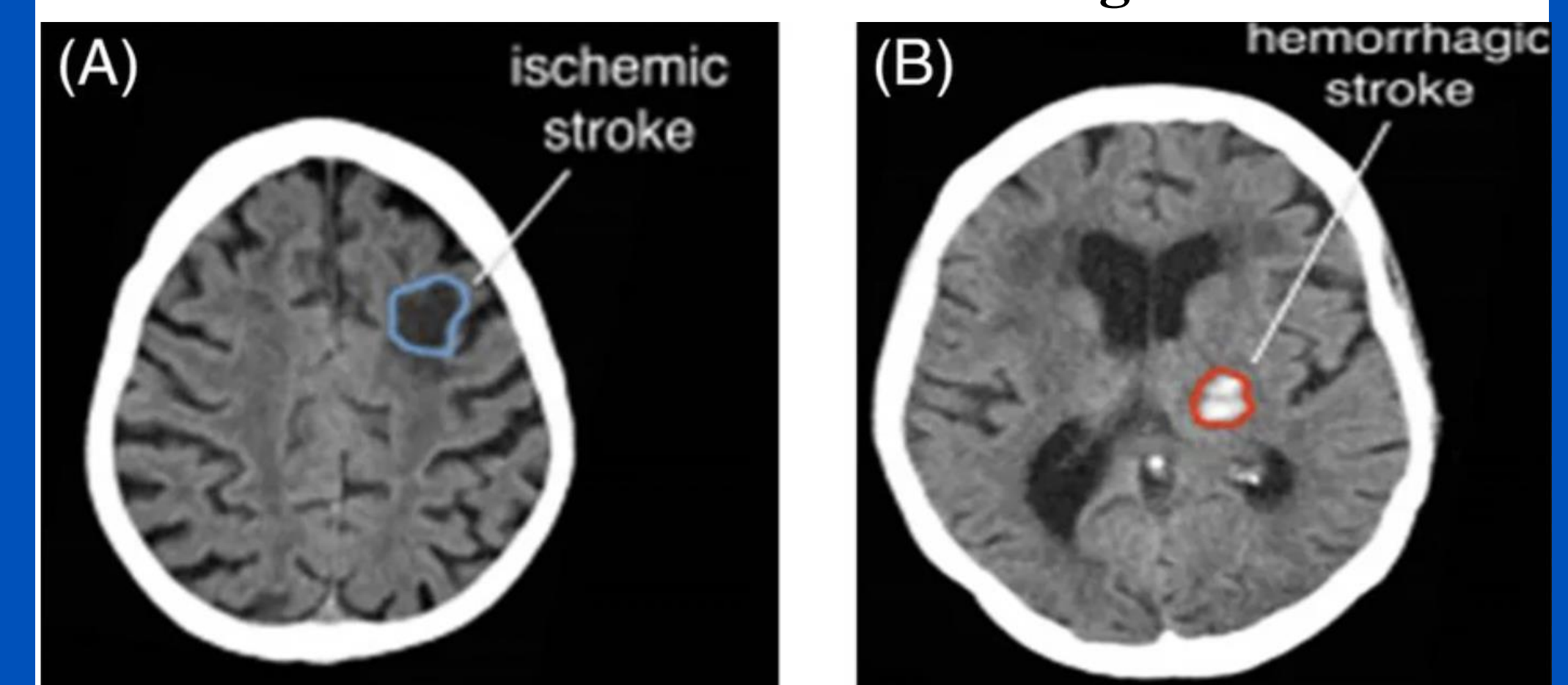
Ebinger et al. (2021) indicate:

- MSUs deliver imaging and stroke care directly to patients, allowing care to begin before hospital arrival.
- This approach shifts stroke care to begin earlier, reducing delays during critical time periods.
- Early diagnosis supports faster treatment decisions and can improve patient outcomes.
- Early evaluation improves communication and coordination once the patient reaches the hospital.

Mac Grory et al. (2024) emphasize:

- MSUs improve stroke care organization by combining imaging, teamwork, and decision-making before transport.
- This approach creates a more organized and consistent stroke care process.

CT of Ischemic vs. Hemorrhagic Stroke



(Perrone & Khoshgoftaar, 2025)