

# Improving Serial Imaging Protocols in Spontaneous Intracerebral Hemorrhage

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## Problem Definition

There is no universally agreed upon protocol to image patient presenting with intra-parenchymal hemorrhage of non-traumatic etiology (sICH). At our institution, it is common practice for a patient to have 3 CT's done within 24 hours. They are often at onset of symptoms or presentation, 6 hours post onset of symptoms, and finally 24 hours post bleed onset.

The goal of this project will be to assess the safety and efficacy of obtaining this repeat imaging in our patients in the hopes that limiting unnecessary CT head studies will decrease resource utilization, decrease patient radiation, expedite movement of stable patients out of the ICU and/or disposition

## Aims For Improvement

-This project plans to decrease the number of scans in this patient population while increasing faculty/staff satisfaction and efficiency of resource utilization.

**The goal is to decrease HCT utilization by 20% without compromising patient care or decision making within 6 months of initiation of the new CT protocol.**

## Intervention

Multidisciplinary attendings, residents, nurses, technologists involved in the care of sICH patients were surveyed. This helped to identify perceived strengths/weakness in current imaging protocols. Results were compiled and will be used for comparison to a post intervention survey.

Populations specific data was compiled and analyzed for a publication (QR code) on risk factors for sICH expansion. **Main risk factors for expansion include ICH score greater than or equal to 3, fluid-fluid level on CT, and cortical ICH.**

This allowed for stratification of low risk, moderate risk, and high risk patient populations for HE to design protocol for serial imaging tiers and DVT ppx.

Protocol has been submitted and approved by neurosurgery, neurointensive care, neurology, and radiology teams.



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## Measurement and Results

### Starting Metrics

**Outcome:** Percent reduction in CT scan in sICH patients.

**Process:** LOS in NICU prior to transfer orders to see if protocol is facilitating quicker downgrades, % patients starting DVT ppx within 24 hours of ictus, review % ICH expansion versus categorization of high, moderate, or low risk ICH to see if we are predicting these correctly

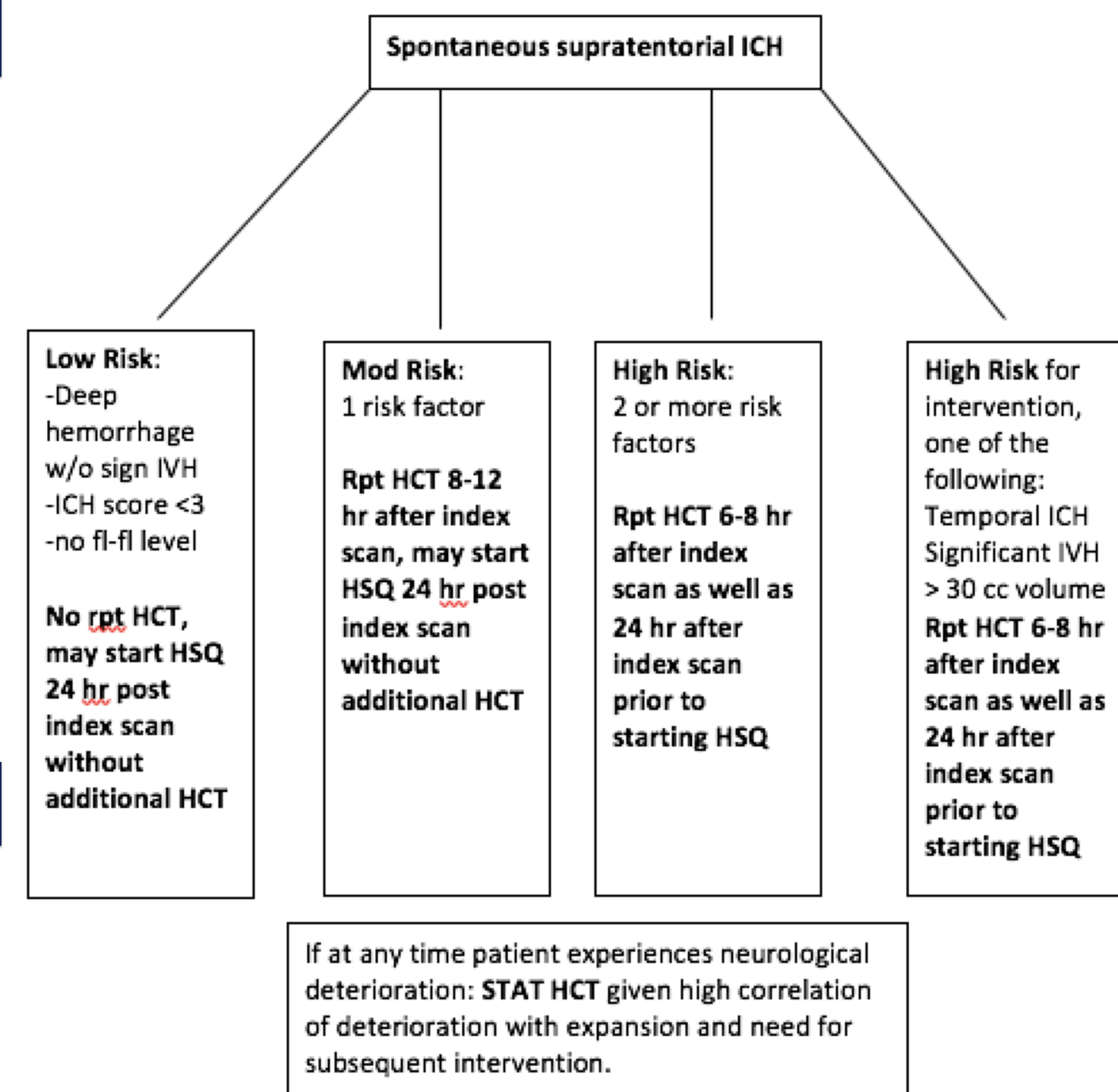
**Balancing measures:** neurological changes requiring scans from off, any hemorrhage expansion that received DVT ppx prior to HCT showing enlarged ICH

At this time, until wider education of new protocol is completed, compliance with remains low.

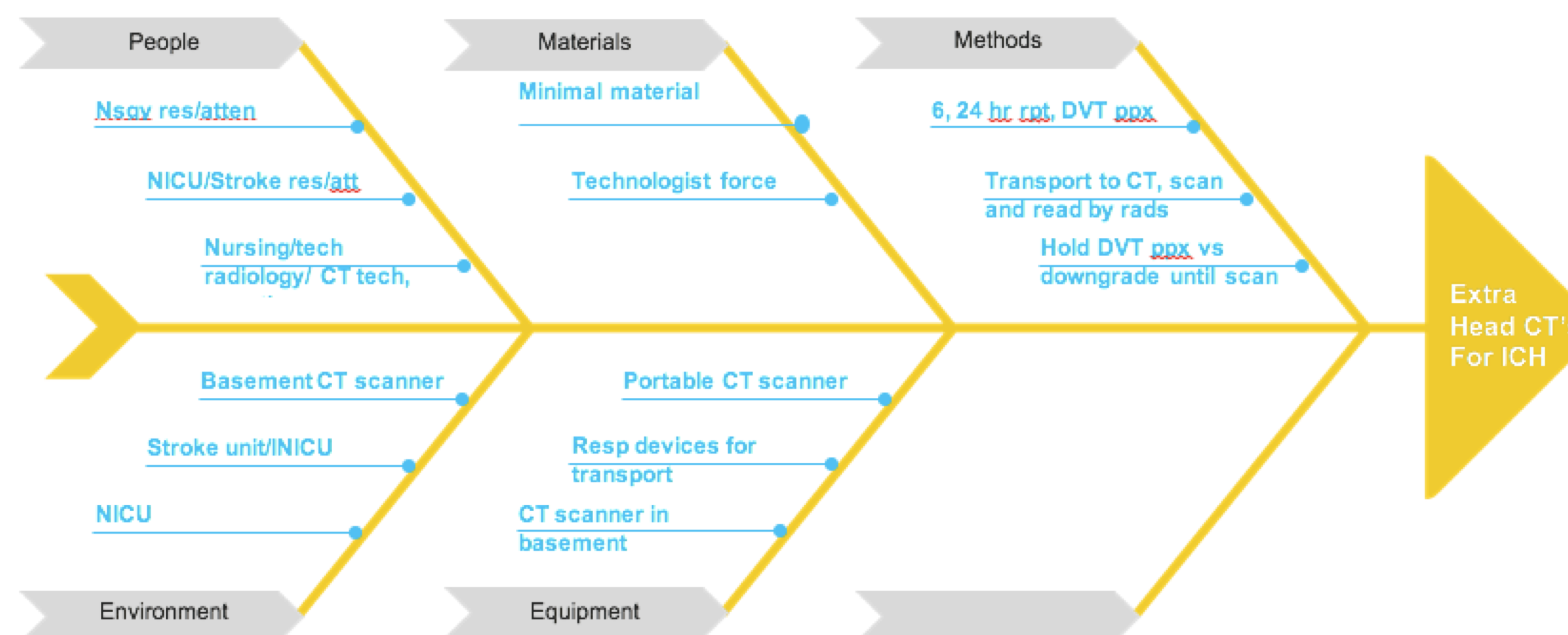
## Next Steps and Lessons Learned

### Next steps:

1. Commence multidisciplinary education on new protocol to all services including neurosurgery, neurology, NICU, and radiology
2. Complete 6 month trial period
3. Compare CT usage 6 month pre and post protocol implementation.
4. Resend survey to evaluate satisfaction with change in protocol.
5. If positive outcome determined, build into EPIC order set for head CT
6. Evaluate for applications to imaging such as traumatic subdural/subarachnoid in trauma patients in ED/Gibbon trauma team.



## Contributors to Additional CT in sICH Patients



### Lessons Learned:

1. Scan protocol should be more individualized or targeted to allow for more efficient resource use. Stratifying by risk factors forces providers to critically assess patient clinical and radiographic risk factors.
2. Institution of a new HCT protocol is challenging as it requires cooperation and education of many providers. It is difficult to change a common protocol (ie overnight resident did not hear of change and does not wish to deviate from prior protocol). Until this is addressed, compliance with the new protocol will remain low.
3. At this time, we are not meeting our goal. Despite an evidence based approach with support from leadership in each department, compliance/enrollment have remained low. If we cannot reach the individual provider level with reeducation of the protocol, institution of a more efficient head CT imaging protocol will remain difficult.