Bridging the Gap between the MR Suite and the Emergency Department

An Emergency Physician's Perspective

Goals

- Understand the drivers of care in the ED
- Understand the constraints of care in the ED
- Understand where MR imaging is now in the emergency care setting and what is required to make it a more accepted, cost effective and a readily available modality

Drivers of ED Care

- Make the right diagnosis or at least make sure nothing life threatening is going on. Poor tolerance for errors in judgment and failure to diagnose. ED is challenging medical-legal environment
- Patients and referring doctors want answers and timely studies. Patients often sent to the ED for "expedited" work-up
- Need fast answers sometimes due to patient condition, sometimes due to pressures on ED flow
- Hospitals and physicians incentivised to do more. Institutions provided all resources including imaging modalities to the ED
- It is a myth that ED are cost centers for hospitals. They are revenue-generating centers that are responsible for tremendous revenue and up to 25% of all admissions.

Constraints on ED Care

- Overcrowding; more patients, longer length of stay and fewer hospitals
- Location of the ED was often an afterthought in most hospitals built > 10-15 years ago. Thus resources and imaging centers often are not close.
- Some patients are too sick to leave the department and if they do leave for imaging they can't go far away or for very long.

As a Result:

- More ED imaging with large increases in ED utilization of almost all imaging modalities including MR, CT and US. New breed of ED physicians using ED bedside US for imaging.
- Concern over radiation well understood by ED physicians but the constraints and demands for timely diagnosis often tip the risk benefit scale.
- The "best" modality or "gold standard is often not done or available leading to duplication of imaging.

Current State of MRI Availability in Emergency Care settings

- Not as easy as other modalities so often not done
- Universally harder to order and protocol than any other imaging modality
- Often far away and in the basement
- Seems to take forever
- Some patients don't tolerate MRI. Sedation outside ED is not something ED physicians like
- Patients are sometimes too sick without medical history and ability to determine absolute contraindications.

Where MR imaging should go and is moving

Case 1

15 year old with anorexia fever RLQ pain over last 24 hours. Otherwise well, not pregnant and clinically has appendicitis. Surgeons not interested without imaging. First has US takes 2 hours and unable to see appendix but small amount of free fluid. Call surgeons not interested want CT, discuss radiation risks but they want the CT. Does not want false negative appy in OR. CT with 4 more hours pass and definitely has appendicitis. Patient was taken to OR, 10 hours after arrival.

Questions?

Why not MR? This patient is safe for travel? Can we not do a simple r/o appy protocol for MR like they do for CT and US? In the end would the patient's care not been faster

with less radiation risk and potentially more cost effective with a MRI. Faster techniques and better sequencing could lead to use in younger children with less need for sedation.

Case 2

62 year old comes in with acute dizziness and ataxia on exam which is gradually resolving. He has no other deficits, has a remote history of TIA and is on ASA. Examination and history is concerning for posterior circulation TIA versus peripheral vertigo. Plain CT head ordered and neurology called. CTA done by neurology. Patient eventually admitted with unclear diagnosis after 12 hours ED stay. MRI done next day shows small posterior circulation stroke

Questions?

Why not MR as first line imaging? This patient is stable, MRI is better for posterior fossa imaging and TIA. It is the standard of care and will often eventually be done resulting in wasted tests, money and time spent in the ED

Where we are going

- At Stanford we no longer get head CT on any of our suspected TIA's all get MRI as first line study. Done within 3 hours of order.

What Emergency Medicine Physicians need from MRI

Faster and More Efficient Imaging

- Protocols with more efficient sequencing
- Move the machine closer to the ED
- Make them easier to order and have spots in scheduling for emergent cases

Summary

MRI use in the ED will increase with faster and more efficient scanning

MRI is often the gold standard or preferred imaging modality (better images, no radiation) but often not used

Increase utilization of MRI in the ED could be more cost effective if we eliminated some CT and US use as first line imaging

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