An audit project to improve the service management of patients presenting with acute stroke compared to the standard guidelines.

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Abstract

Stroke is a preventable and treatable disease. Over the past two decades, a growing body of evidence has overturned the traditional perception that stroke is simply a consequence of aging that inevitably results in death or severe disability. Evidence is accumulating for more effective primary and secondary prevention strategies, better recognition of people at highest risk and interventions that are effective soon after the onset of symptoms. Understanding of the care processes that contribute to a better outcome has improved, and there is now a good evidence to support interventions and care processes in stroke rehabilitation.

A retrospective study was conducted in Nevill Hall hospital over nearly 20 months. 31 patients were included in the comparative study with majority of them octogenarians and females were predominant. Nearly two thirds of the patients were complaining from hypertension and half of them were smokers. more than two thirds of patients were on anticoagulants either on warfarin or NOACs which required reversal of the agent in the first group.

While the adherence to the guidelines in the neurological observation and blood pressure measurements were achieved, there was significant lag in the arrangement of the CT scans whether for those who were admitted in the frontline (30% only) or those who showed acute deterioration in their GCS which required immediate repeat of the scan. Also, there was a noticeable delay in neurosurgical referral which could be acknowledged that most of the cases deemed to be out of the scope of intervention, but possible a clearer documentation needs to be seen to accomplish a safe and quality effect pathways for stroke team in future.

After analyzing the data available, a necessity for a clear set of guidelines has been created to guide the treating physicians who are dealing with stroke patients in the acute admission units. This could be done by guiding posters or flyers to encourage them for rapid CT scan requests either on presentation on times of acute deterioration in those groups of patients who can also require a rapid and cost effective referral to the neurosurgical teams in the tertiary centres.

Keywords: Stroke, Cerebrovascular insults, Hypertension.

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Definition

Stroke is an acute neurological deficit caused by cerebrovascular insults. It is further subdivided into ischaemic stroke and haemorrhagic stroke. Ischaemic stroke is lack of blood perfusion due to occlusion or critical stenosis of a cerebrospinal artery, and haemorrhagic stroke is due to rupture of a cerebral arteries, resulting in intraparenchymal, subarachnoid, and intraventricular haemorrhage. Intracerebral haemorrhage is further subdivided into primary and secondary aetiology. Primary spontaneous intracerebral haemorrhage is defined as haemorrhage in the absence of vascular malformations or associated diseases. Secondary intracerebral haemorrhage is from an identifiable vascular malformation or as a complication of other medical or neurological diseases that either impair coagulation or promote vascular rupture [2].

Incidence and prevalence

Stroke is a major health problem in the UK. It accounted for over 56,000 deaths in England and Wales in 1999, which represents 11% of all deaths. Most people survive a first stroke, but often have significant morbidity. Each year in England, approximately 110,000 people have a first or recurrent stroke and a further 20,000 people have a TIA. More than 900,000 people in England are living with the effects of stroke, with half of these being dependent on other people for help with everyday activities. Nearly 85% of these strikes are ischemic and 15% are hemorrhagic [3].

Presentation

Patients with hemorrhagic stroke present with focal neurologic deficits similar to those of ischemic stroke but tend to be more ill than are patients with ischemic stroke. However, though patients with intracerebral bleeds are more likely to have headache, altered mental status, seizures, nausea and vomiting, and/or marked hypertension, none of these findings reliably distinguishes between hemorrhagic and ischemic stroke [4].

Pathophysiology

The usual mechanism is thought to be leakage from small intracerebral arteries damaged by chronic hypertension. Other mechanisms include bleeding diatheses, iatrogenic

anticoagulation, cerebral amyloidosis, and cocaine abuse.

Intracerebral hemorrhage has a predilection for certain sites in the brain, including the thalamus, putamen, cerebellum, and brainstem. In addition to the area of the brain injured by the hemorrhage, the surrounding brain can be damaged by pressure produced by the mass effect of the hematoma. A general increase in intracranial pressure may occur [5] (Figure 1).

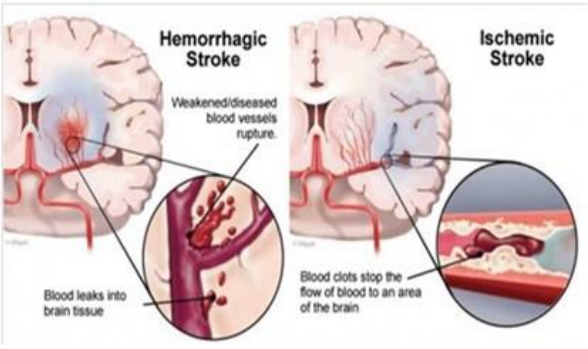

Figure 1. *Intracerebral hemorrhage has a predilection for certain sites in the brain, including the thalamus, putamen, cerebellum, and brainstem. In addition to the area of the brain injured by the hemorrhage, the surrounding brain can be damaged by pressure produced by the mass effect of the hematoma. A general increase in intracranial pressure may occur.*

Aim and the objectives

Audit in Management of Hemorrhagic stroke against current guidelines (RCP and NICE guidelines) [1-3].

Standards

Patients with hemorrhagic stroke requiring urgent brain imaging are scanned in the next scan slot within usual working hours, and within 60 minutes of request out-of-hours with skilled radiological and clinical interpretation being available 24 hours a day [6].

Hourly neurological observations (GCS).

Hourly blood pressure observations.

Specialist neurological care including neurosurgery expertise is rapidly available. [Initial monitoring and management of hemorrhagic stroke patients should take place in an intensive care unit or stroke unit with physician and nursing neuroscience acute care expertise] [7].

Clotting levels in people with a primary intracerebral haemorrhage who were receiving anticoagulation with a vitamin K antagonist (eg warfarin) before their stroke, should be returned to a normal international normalised ratio (INR) as soon as possible, by reversing the effects of the warfarin/vitamin K antagonist treatment using a combination of prothrombin complex concentrate and intravenous vitamin K [6-8].

Methods of study

Retrospective audit to re-evaluate the management of 31 patients with haemorrhagic stroke over the period from January 2013 until September 2014 in Nevill Hall hospital, mainly in stroke department and by looking back on their medical records. Furthermore, it also included collateral data like age, sex, risk factors such as HT, DM and smoking, antiplatelet and anticoagulant drugs use in those patient groups.

Audit proforma was designed the data see appendix 1.

Appendix 1

(Audit Performa)

Patient details

NHS number:

Age:

Sex: M/F

Clinical history

HT: Y/N

DM: Y/N

Previous stroke/ Bleeding: Y/N

Bleeding tendency: Y/N

Drug history

Antiplatelets: Y/N

Warfarin: Y/N

Other anticoagulants: Y/N

Smoking

Current, ex-smoker, Never

Lab measures

PT, PTT

INR

Admission

Ward: Stroke unit

ITU: Neurosurgery unit:

Time of admission:

GCS

GCS on admission:

Time of GCS:

Time to scan:

GCS frequency:

If GCS declines: time:

Rescan: Y/N

time:

BP on admission

BP every hour: Y/N

If N: Frequency of BP measurements:

Referral to neurosurgeon

Y/N

Treatment

Reversal of warfarin:

Outcome

Death: Y/N

Discharge destination: home, residential care

List of all admissions that meet the audit criteria were obtained from patient administration system.

The national stroke strategy guidelines [6], coupled with NICE and royal college of physician guidelines have been analyzed and then compared with European Stroke Organization and American Stroke Association guidelines for haemorrhagic stroke (Figure 2).

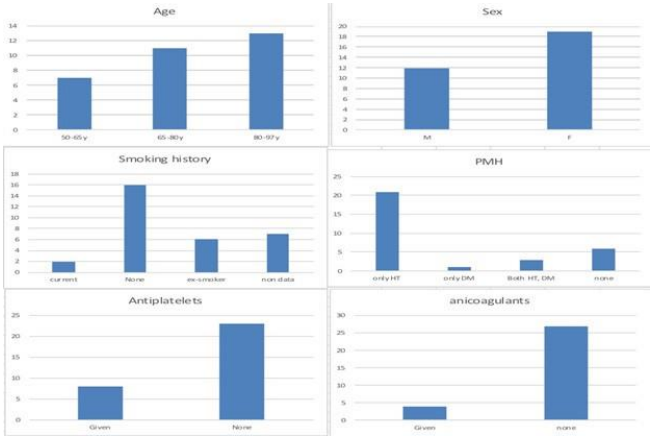

Figure 2. *List of all admissions that meet the audit criteria were obtained from patient administration system.*

Results and Analysis

A. Only 11 patients out of the total had their CT scan in the first hour of admission, while 8 of them had it after 1.5-2.5 hours of first presentation. The median time of CT scan for the rest of the group was around 16 hours (Figure 3).

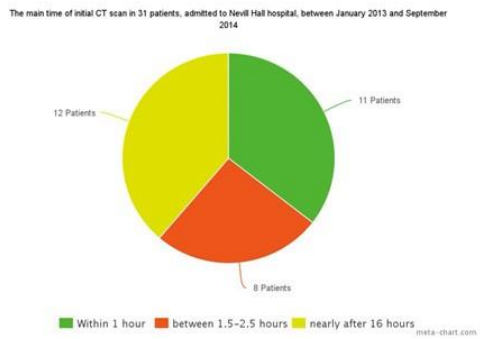

Figure 3. *Only 11 patients out of the total had their CT scan in the first hour of admission, while 8 of them had it after 1.5-2.5 hours of first presentation. The median time of CT scan for the rest of the group was around 16 hours.*

B - around 10 patients (n= 31) showed a decline in their GCS , which was mandating an urgent CT scan within one hour window according to the management plan. Nonetheless, 6 out of them didn't have the scan within mentioned time period. Other four didn't have CT scan in the survey, 3 of them deemed poor prognosis after discussion with the families. They were registered dead shortly after the GCS decline (Figure 4).

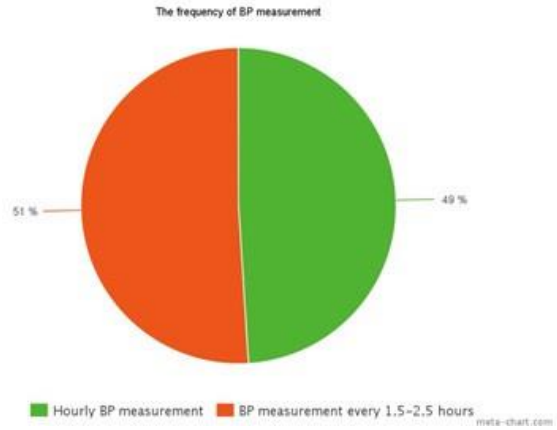

Figure 4. *Around 10 patients (n= 31) showed a decline in their GCS , which was mandating an urgent CT scan within one hour window according to the management plan. Nonetheless, 6 out of them didn't have the scan within mentioned time period. Other four didn't have CT scan in the survey, 3 of them deemed poor prognosis after discussion with the families. They were registered dead shortly after the GCS decline*

Neurological observation (GCS) (Appendix 2) has been noted to be measured in the group mostly every an hour except in 4 patients, when it was checked between 2-2.5 hours. This means nearly 90% following the standard (Figure 5).

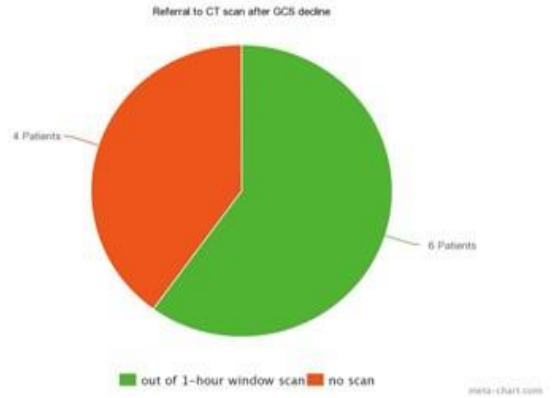

Figure 5. *Neurological observation (GCS) (Appendix 2) has been noted to be measured in the group mostly every an hour except in 4 patients, when it was checked between 2-2.5 hours. This means nearly 90% following the standard.*

Appendix 2. *Glasgow coma score.*

Appendix 2	
Glasgow coma score	
Observation	**Patients**
Eyes(s) opening	
Spontaneous	4
To Speech	3
To pain	2
No response	1
Eyes(s) opening	

Oriented to time, place, person	5
Confused/disorientated	4
Inappropriate words	3
Incomprehensible sounds	2
No response	1
Eyes(s) opening	
Obeys commands	6
Moves to localized pain	5
Flexion withdraws from pain	4
Abnormal flexio	3
Abnormal extension	2
No response	1
Best response	15
Comatose patient	8 or less
Totally unresponsive	3

BP was measured every hour nearly in a half of the patients (n=31). In the other half, this was done in a range extending between 1.5-2.5 hours (Figure 6).

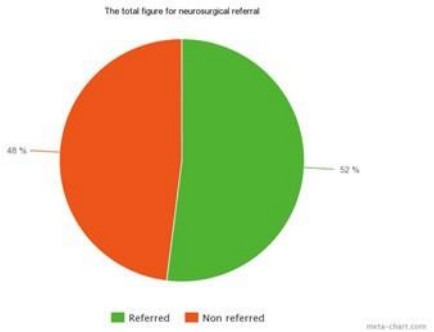

Figure 6. *BP was measured every hour nearly in a half of the patients (n=31). In the other half, this was done in a range extending between 1.5-2.5 hours.*

Neurosurgeon referral, which is advised in each patient with hemorrhagic stroke, it was achieved nearly in a half of them (Figure 7).

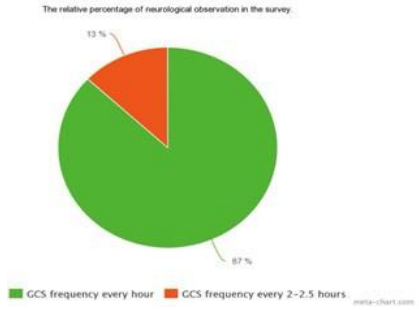

Figure 7. *Neurosurgeon referral, which is advised in each patient with hemorrhagic stroke, it was achieved nearly in a half of them.*

For those who had received warfarin before the stroke, their INR was checked and reversed soon by combination of vitamin K and PCC. There were only 4 patients over all the time span, revealing 100% compliance with the standards.

Conclusion

At the end of September 2014, we have reached to a conclusion that approximately third of patients have their scan in the first hour of admission, while all the figures of rescanning were delayed. Furthermore, neurosurgical referral was done nearly in half of them, without clear evidence in the other half. Nevertheless, the protocol of warfarin reversal was completed totally.

Limitations

The survey was retrospective in its standard of data collection.

Small sample size

Electronic records, which could be not reflective the seriousity.

Recommendations

Key points/mission critical points taken from NICE, national stroke strategy and other professional bodies have to be documented within approved care pathways and checklists.

Areas of non compliance(hourly GCS monitoring, neurosurgeon referral and radiology input) have to be highlighted and discussed with involved clinicians and senior consultants.

Asking the medical staff to review the neuro ops every hour and paying much more attention to GCS review as it is crucial to proceed to further scans.

Posting different posters in the A/E and stroke wards demonstrating the basic importance of rapid referral to CT and its sequelae on life quality of the patients.

Asking them for re-audit to monitor the improvements.

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