

TheAHSNNetwork 

**HYPERTENSION & STROKE IN PREGNANCY:
THE CHICKEN OR THE EGG**




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FRIMLEY HEALTH NHS TRUST**

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Patient Safety Collaborative


Thames Valley 
Strategic Clinical Network



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The plan...

- Case presentation
- Subsequent events
- Thoughts?
- Literature review & discussion
- Close

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11/2/18 22:00h
Obstetric referral from A&E...




“Collapsed pregnant lady with high BP”

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History

- 23 years old
- 35/40 pregnant

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History

- 23 years old
- 35/40 pregnant - thus far uncomplicated first pregnancy
 - had missed an antenatal appointment at 32/40

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History


- 23 years old
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Un-witnessed collapse onto bedroom floor from her bed

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History

- 23 years old
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 - had missed an antenatal appointment at 32/40

Un-witnessed collapse onto bedroom floor from her bed

No evidence of seizure activity and none was witnessed

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History

- 23 years old
- 35/40 pregnant - thus far uncomplicated first pregnancy
 - had missed an antenatal appointment at 32/40

Un-witnessed collapse onto bedroom floor from her bed

No evidence of seizure activity and none was witnessed

She was previously fit & well with no recent illnesses

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Examination

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Improvement

Examination

A Patent

B RR normal
Sats 98%
Chest clear on auscultation

C BP 190/120
Cool peripheries, CRT 3s

D GCS 14/15
Dense left hemiparesis
Aphasic

E Abdomen SNT
Patient complaining of headache
FH present

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Improvement

Challenge No 1

- Do we treat or not high BP in acute stroke?

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Stroke results in:

- (1) Direct injury to autonomic inhibitory regions in the brain
- (2) Indirectly, reduced parasympathetic activity

Result is increased Sympatho-adrenal tone:

- (1) Activation of renin-angiotensin-aldosterone system
- (2) Arteriolar vasoconstriction
- (3) Increased circulating catecholamines

Results in:

- (1) Abrupt increase Systemic Vascular Resistance
- (2) Impaired Carotid Baroreceptor sensitivity


Resulting accelerated hypertension causes endothelium damage:

- (1) Further local vasoconstriction
- (2) Damages local autoregulation function

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Stroke
Diagnosis and initial management of acute stroke and transient ischaemic attack (TIA)

1.5.3 Blood pressure control

1.5.3.1 Anti-hypertensive treatment in people with acute stroke is recommended only if there is a hypertensive emergency with one or more of the following serious concomitant medical issues:


- hypertensive encephalopathy
- hypertensive nephropathy
- hypertensive cardiac failure/myocardial infarction
- aortic dissection
- pre-eclampsia/eclampsia
- intracerebral haemorrhage with systolic blood pressure over 200 mmHg.


1.5.3.2 Blood pressure reduction to 185/110 mmHg or lower should be considered in people who are candidates for thrombolysis.



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Initial management

- Insertion of Folley catheter
- Urine dip: 3 (+) protein


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Challenge No. 2

- How do we treat high BP?


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Table 2 Possible agents for managing hypertension in acute stroke





AGENTS	GUIDELINES
Intravenous agents	Need continuous haemodynamic monitoring Aim for gradual reduction in BP by 5–15%
Labetalol	10–20 mg bolus over 1–2 mins. Dose can be repeated up to maximum dose of 300 mg. Alternatively, labetalol infusion 2 mg/min can be used.
Glyceryl trinitrate	10–200 µg/min titrated according to BP
Sodium nitroprusside	0.5–1.5 µg/kg/min titrated according to BP (avoid in intracerebral haemorrhage due to antiplatelet properties)
Nicardipine	5 mg/h infusion titrated according to BP up to maximum of 15 mg/h
Sublingual agents	Should be avoided as may cause precipitous falls in BP
Oral agents	Not always possible as up to 50% patients dysphagic
Transdermal agents	Glyceryl trinitrate patch 5–10 mg/24 h titrated according to BP


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Initial management

- Insertion of Folley catheter
- Urine dip: 3 (+) protein
- Stabilisation of BP with IV Labetalol
- IV Magnesium bolus and infusion

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CT Head 23:30h

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CT Head 23:30h




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CT Head 23:30h


“No definite evidence of acute intracranial pathology”

“Small area of low attenuation in the right temporal lobe is undetermined [not sure if represents small parenchymal abnormality, artefact or a small area of widened CSF space]”

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12/2/18 00:00h





- Patient transferred to labour ward with ITU attendance
- Accompanied by husband
- Assessed by obstetric and anaesthetic teams


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Bloods




Hb 97	U+Es NAD
WBC 14.68	LFTs NAD
PLT 287	eGFR >90
APTT 30.1 (25.5-35.5)	Urate 374
APTT Ratio 1.03	Albumin 30
PT 13.4 (12.5-17)	PCR: 70


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Challenge No.3




- To deliver or not ?


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Considerations




- Severe PET, but stable BP
- Unknown intracranial pathology
- Anesthetic considerations
- Multiple discussions between anaesthetics, obstetrics & stroke teams in Wexham/Oxford and High Wycombe


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What we did




- Decision made to deliver the baby as a category 2 caesarean-section


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What we did




- Decision made to deliver the baby as a category 2 caesarean-section
- General anaesthetic
 - labetalol (titrated)
 - opiates
- Generally uneventful intraoperative course
- Blood pressure stabilised – no arterial line


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Postoperatively...




- Decision made to extubate the patient
- Slow wake
- Extubated after around 45 minutes

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Investigations

Electively re-intubated on ITU for an MRI Head on 12/2/18

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This slide features a central axial MRI scan of the brain. The scan shows a hyperintense (bright) area in the right hemisphere, likely representing a stroke or other acute pathology. The surrounding brain tissue appears normal. The slide is framed by a black border and includes logos for 'TheAHSNNetwork', 'NHS Improvement', 'Oxford Patient Safety Collaborative', 'Thames Valley Strategic Clinical Network NHS', and 'NHS Frimley Health NHS Foundation Trust'.

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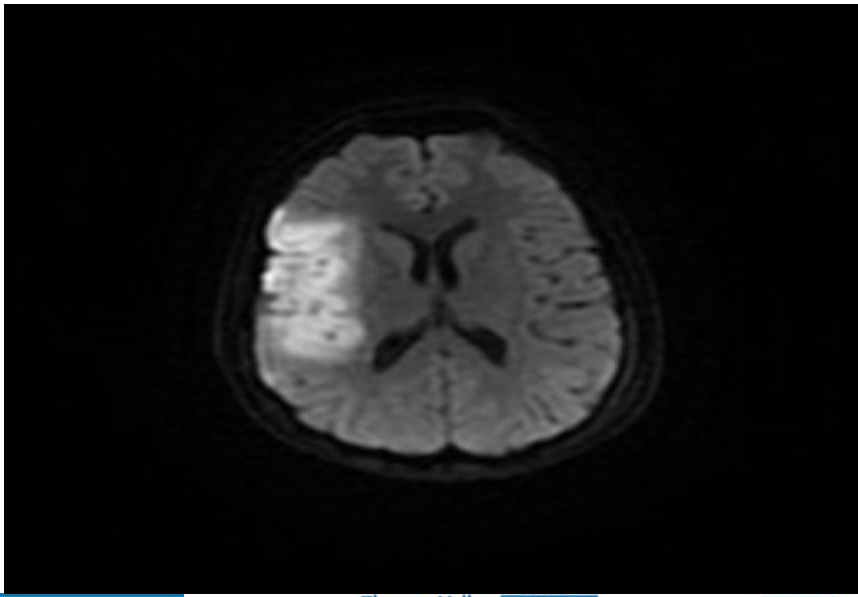
Thames Valley Strategic Clinical Network NHS

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This slide is identical to the one above, featuring the same axial MRI scan of the brain with a hyperintense lesion in the right hemisphere. It also includes the same logos: 'TheAHSNNetwork', 'NHS Improvement', 'Oxford Patient Safety Collaborative', 'Thames Valley Strategic Clinical Network NHS', and 'NHS Frimley Health NHS Foundation Trust'.

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This slide displays an axial MRI scan of the brain. The image shows a cross-section of the brain with a prominent hyperintense (bright) area in the left hemisphere, likely representing a stroke or other pathological lesion. The scan is framed by a black border. At the top left, the text 'TheAHSNNetwork' is visible. At the top right, the 'NHS Improvement' logo is present. At the bottom left, there is a box containing 'Oxford Patient Safety Collaborative'. At the bottom center, the text 'Thames Valley Strategic Clinical Network' is followed by the 'NHS' logo. At the bottom right, the text 'Frimley Health NHS Foundation Trust' is followed by the 'NHS' logo.

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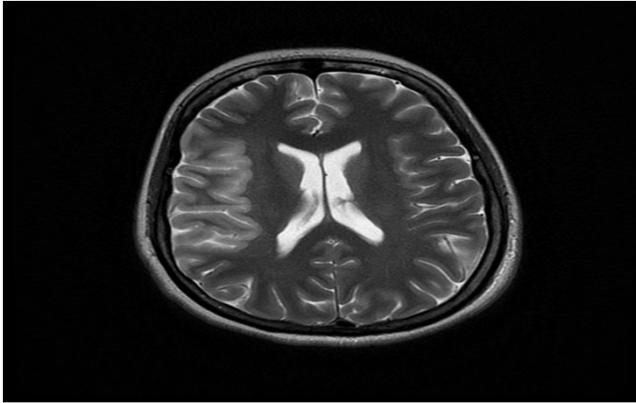
Frimley Health NHS Foundation Trust

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Investigations

Electively re-intubated on ITU for an MRI Head on 12/2/18



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Investigations

Electively re-intubated on ITU for an MRI Head on 12/2/18

“Acute right MCA territory infarct, no venous sinus pathology identified”




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Repeat CT Head on 13/2/18




“Increased mass-effect with low attenuation in the right frontal parietal cortex, now extending to the basal ganglia.”


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Next steps





- Transferred to the John Radcliffe Hospital on 13/2/18 after CT findings


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Next steps





- Transferred to the John Radcliffe Hospital on 13/2/18 after CT findings
- Considered for hemicraniectomy
- Surgery halted in favour of conservative mx
- However, ongoing SpO₂ desaturations...


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Next steps




- CTPA excluded PE but confirmed pneumonia


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Next steps




- CTPA excluded PE but confirmed pneumonia
- Treated with co-amoxiclav
- Transferred to Wycombe General Hospital stroke unit 3 days later on 16/2/18 for stroke rehabilitation


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Further Ix & Mx




- Aspirin 300mg OD for 14 days, then switched to clopidogrel 75mg OD
- Ramipril 2.5mg OD


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Further Ix & Mx




- CT Angiogram Aortic Arch & Carotids normal
- Bubble Echo normal


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Further Ix & Mx




- Intense rehabilitation with physiotherapy, occupational therapy and speech and language therapy


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Further Ix & Mx




- Intense rehabilitation with physiotherapy, occupational therapy and speech and language therapy
- She made excellent progress


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Current progress




- Intense rehabilitation with physiotherapy, occupational therapy and speech and language therapy
- She made excellent progress
- Speech returned as did movement and power in her left side


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Current progress




- Intense rehabilitation with physiotherapy, occupational therapy and speech and language therapy
- She made excellent progress
- Speech returned as did some movement and power in her left side
- Discharged home 12/3/18


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Current progress

- Intense rehabilitation with physiotherapy, occupational therapy and speech and language therapy
- She made excellent progress
- Speech returned as did some movement and power in her left side
- Discharged home 12/3/18
- Due follow up 6 to 8 weeks post-discharge




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Investigations

“Young Stroke” blood test profile was negative.




- Antiphospholipid
- ANCA/ANA
- Anticardiolipin
- B2 glycoprotein
- Thrombophilia screen
- Homocysteinuria screen


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Question No.4

- Should we have thrombolysed?



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Management of stroke in pregnancy


- No gold standard management
- Pregnant women are uniformly excluded from participation in clinical trials involving thrombolytics
- Obstetricians are often the first providers to be contacted by symptomatic patients
- Most pregnant or newly postpartum women with ischemic stroke do not receive acute stroke reperfusion therapy, although this is the recommended treatment for adults ^{1,2}

• 1. Gartman, Obstet Medicine, 2013
 • 2. Leffert et al, Am J Obstet Gynaecol 2016)


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Management of stroke in pregnancy

- Pregnancy should not alter the standard of care for women with stroke. All women with stroke, pregnant or not, should be admitted to a **Hyperacute Stroke Unit**.
- Neither pregnancy, caesarean section delivery nor the immediate postpartum state are absolute contraindications to **thrombolysis** (intravenous or intra-arterial), clot retrieval or craniectomy
- Liaison with Obstetric services is essential





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Alteplase (rtPA)




- Does not cross the placenta (7200 KDa), but categorised as category C drug in FDA.
- Pregnancy not a contraindication in BNF
- No data regarding teratogenicity in humans, but no risk in animal studies.

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Use of thrombolysis in pregnancy (Gartman, Obstet Medicine, 2013)

- 18 cases identified for use in ischaemic strokes
- There were **no maternal deaths** attributed to thrombolytic administration (one death reported due to arterial dissection during angioplasty), **no major bleeding events**, four minor bleeding events, one preterm delivery with good outcome, and three fetal deaths/spontaneous abortions

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Use of thrombolysis in pregnancy (Leffert et al, Am J Obstet Gynaecol 2016)

- Rates of acute stroke reperfusion therapy were similar in pregnant or postpartum women (40/338 [11.8 percent]) compared with nonpregnant women (2545/24,303 [10.5 percent]).
- Treatment with intravenous tPA monotherapy was less frequent in pregnant or postpartum women compared with nonpregnant women (4.4 versus 7.9 percent).
- Among those treated with acute reperfusion therapy, there was a higher rate of symptomatic intracranial haemorrhage in pregnant or postpartum women (3/40 [7.5 percent]) compared with nonpregnant women (66/2545 [2.6 percent]); the difference did not achieve statistical significance, although limited by small numbers of patients.
- Among those treated with acute reperfusion therapy, there was no significant difference between pregnant or postpartum women and nonpregnant women for rates of in-hospital death (2.1 versus 2.7 percent), discharge to home (75 versus 73 percent), or independent ambulation at home (74 versus 71 percent).


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Intra-arterial thrombectomy




- Five multicenter, open-label randomized controlled trials (MR CLEAN , ESCAPE , SWIFT PRIME , EXTEND-IA , and REVASCAT)
- Safe and effective for reducing disability
- Superior to standard treatment with intravenous thrombolysis alone for ischemic stroke caused by a documented large artery occlusion in the proximal anterior circulation
- NNT is 3 to 7.4
- No evidence for pregnant patients


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Learning points




- Patients suffering a stroke in pregnancy should be assessed by a multidisciplinary team, comprising of Neurologists , Obstetricians and Anaesthetists
- Initial place of assessment should be the Hyperacute stroke unit
- Pregnancy is not a contraindication for thrombolysis and should be always be considered

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Positive points

- Delivery as indicated making special arrangements considering diagnosis of Pre-eclampsia
- Senior input throughout case by Consultant Obstetricians and Anaesthetists
- Excellent patient outcome for mother and baby.

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Thank you

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SAVE A LIFE.**

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Special thanks

- Dr Hannah Catton, CT2 Anesthetics
- Miss Kalla, Obstetrics Consultant
- Dr Selvan, Anaesthetic Consultant
- Dr Hilton, Neurology Consultant

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