Acute Stroke Presentations and Updates in Practice Updates in Medicine Bristol, Southwest - 15 May 2025

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Declaration for Dr. Irmak Salt

I have no financial interests or relationships to disclose with regard to the subject matter of this presentation.

History of Stroke and Stroke Medicine

- In 5th century BC, first described by Hippocrates as 'apoplexy', meaning struck down by violence/struck with force.
- In 1602, Felix Platter carried out a brain autopsy after the death of one of his stroke patients. An early understanding of stroke:
- a phlegmatic humour is obstructing the inner passages of the brain"
- 1658, Johann Jakob Wepfer, worked on cerebral arteries, and described two separate events: clots and haemorrhages



https://cdn.britannica.com/88/121088-050-90C9B6F9/Hippocrates-bust.jpg



1812 - Jean-André Rochoux First modern texts of stroke

1850-1920 Cerebrovascular clinical syndromes and anatomy

1977 - first publication Aspirin use in stroke

1995 - tPA in stroke



Brief Summary of Stroke and Acute Stroke Treatment

- to death." (NICE 2023)
- million people living with stroke.
- UK.
- Strokes are occurring at an **earlier age** age at onset fell from 70.5 to 68.2 years in males adults aged between 40 and 69 years.
- Overall death from stroke is decreasing but still an important cause of disability.

• "Stroke is a clinical syndrome of presumed vascular origin characterized by rapidly developing signs of focal or global disturbance of cerebral functions which lasts longer than 24 hours or leads

• There are around 100,000 strokes every year in the UK. In the UK there are approximately 1.3

• Stroke is a leading cause of death and disability, causing around 38,000 deaths each year in the

and 74.5 to 73.0 years in females between 2007 and 2016, and over a third of strokes occurred in







Brief Summary of Stroke and Acute Stroke Treatment

- are associated with higher mortality.
- Ischaemic stroke decreased from 18.3 per 100 patients in 2007 to 11.9 per 100 patients in 2020. Haemorrhagic stroke decreased from 37.1 per 100 patients in 2008 to 30.5 per 100 patients in 2020.
- The penumbra was classically defined as the hypo-perfused tissue surrounding the ischemic core in which blood flow is too low - our main target with reperfusion treatments

• %85 of all strokes are ischemic and the rest is haemorrhagic strokes. Haemorrhagic strokes



CEREBRAL ARTERIES

https://dana.org/app/uploads/2023/09/stroke-penumbra-cartoon-basics-300x211-1.png



Brief Summary of Stroke and Acute Stroke Treatment

Thrombolysis

First 4.5 hours from onset

Disabling deficit (no NIHSS cut off)

No intracranial bleed on CT Head

BP < 185/110

Not on any anticoagulation or no known clotting problems (INR, aPTT, plt values)

Relative contraindications

Thrombectomy

First 6 hours from onset

NIHSS 6 or more

Large vessel occlusion on CTA

mRS 0-2

1a—Level of consciousness	0 = Alert; keenly responsive
	1 = Not alert, but arousable by mi
	2 = Not alert; requires repeated st
	3 = Unresponsive or responds onl
1b—Level of consciousness questions:	0 = Answers two questions correc
What is your age?	1 = Answers one question correct
What is the month?	2 = Answers neither questions co
1c—Level of consciousness commands:	0 = Performs both tasks correctly
Open and close your eyes	1 = Performs one task correctly
Grip and release your hand	2 = Performs neither task correctl
2—Best gaze	0 = Normal
	1 = Partial gaze palsy
	2 = Forced deviation
3—Visual	0 = No visual lost
	1 = Partial hemianopia
	2 = Complete hemianopia
	3 = Bilateral hemianopia
4—Facial palsy	0 = Normal symmetric movement
	1 = Minor paralysis
	2 = Partial paralysis
	3 = Complete paralysis of one or
5—Motor arm	0 = No drift
Left arm	1 = Drift
Right arm	2 = Some effort against gravity
	3 = No effort against gravity
	4 = No movement
6—Motor leg	0 = No drift
Left leg	1 = Drift
Right leg	2 = Some effort against gravity
	3 = No effort against gravity
	4 = No movement
7—Limb ataxia	0 = Absent
	1 = Present in one limb
	2 = Present in two limbs
8—Sensory	0 = Normal; no sensory loss
	1 = Mild-to-moderate sensory los
	2 = Severe-to-total sensory loss
9—Best language	0 = No aphasia; normal
	1 = Mild-to-moderate aphasia
	2 = Severe aphasia
	3 = Mute; global aphasia
10—Dysarthria	0 = Normal
	1 = Mild-to-moderate dysarthria
	2 = Severe dysarthria
11—Extinction and inattention	0 = No abnormality
	1 = Visual, tactile, auditory, spati
	2 = Profound hemi-inattention or
Score = 0-42	

ninor stimulation
stimulation
nly with reflex
ectly
xly
orrectly
y
tly
nts
hoth oldos
both sides
SS
ial, or personal inattention r extinction

NIHSS

Modified Rankin Score (mRS)

Points	Grade of disability
0	No symptoms
1	No significant disability. Some symptoms
2	Slight disability. Able to perform daily previous activities.
3	Moderate disability. Requires some help,
4	Moderate severe disability. Needs for as without assistance.
5	Severe disability. Unable to attend own and attention. Incontinent.
6	Dead.

https://www.researchgate.net/publication/362176503/figure/fig1/AS:11431281187927468@1694451395222/Modified-Rankin-Scale-mRS-The-Modified-Rankin-Score-mRS-is-a-6-pointdisability.tif

but able to carry out all usual activities

activity without assistance, but unable to carry out

unable to walk alone without assistance.

ssistance for own bodily needs, unable to walk alone

body needs without constant assistance, nursing care



Updates in Practice

Mainly focusing on Acute Care

National Clinical Guidelines for Stroke was updated in 2023.

NATIONAL CLINICAL GUIDELINE FOR STROKE for the United Kingdom and Ireland

What's new in the 2023 edition



considered in patients presenting within 24 hours of TIA and minor stroke. [see 3.3 B]

- no significant difference in haemorrhagic stroke. A 300 mg loading dose of clopidogrel.
- POINT trial (2018): in patients with TIA or minor ischaemic stroke (NIHSS 0-3) that dual Clopidogrel.
- (0.4%)

Dual antiplatelet therapy with either aspirin and clopidogrel, or aspirin and ticagrelor, should be

• CHANCE trial (2013): In patients with TIA or minor ischaemic stroke (NIHSS 0-3) that dual antiplatelet therapy started within 24 hours of onset for 21 days resulted in a significant reduction in ischaemic stroke from 11.7% (aspirin group) to 8.2% (aspirin-clopidogrel group) with

antiplatelet therapy started within 12 hours of onset and continued for 90 days resulted in a significant reduction of ischaemic stroke from 6.5% (aspirin group) to 5.0% (aspirin-clopidogrel group). Trial stopped early (effectiveness, increased haemorrhage - %0.5) 600mg loading dose of

• **THALES** trial (2020): in patients with a high-risk TIA or minor ischaemic stroke (**NIHSS 0-5**) that dual antiplatelet therapy with aspirin and ticagrelor started within 24 hours of onset resulted in a significant reduction in composite outcome of stroke or death from 6.6% (aspirin group) to 5.5% (aspirin-ticagrelor group) within 30 days. 180mg loading, increased GI bleed



Since then

- INSPIRES trial (Dec 2023)
 published in NEJM
- 222 centre in China
- in patients with TIA (within 72 hours) or minor ischaemic stroke (NIHSS 0-5) within 24 hours
- Cardioembolic strokes were excluded



Gao Y et al. N Engl J Med2023;389:2413-2424

Presentation	DAPT Regime	Selection Criteria	Recommen
	Acute Ischemic Stroke Treatment		
Acute ischemic stroke \leq 4.5 h of onset	ASA 300 mg + CLO 300 mg (600 mg in selected patients), instead of IV thrombolysis	NIHSS \leq 5, Non-disabling, No LVO or capsular warning syndrome	Class 2 reasona
	Short-Term Treatment for Non-Cardioembolic Ischemic Stre	oke or TIA up to 3 Months	
Minor Stroke or High-Risk TIA \leq 24 h of onset (may be considered up to 7 days)	ASA 300 mg + CLO 300 mg (600 mg in selected patients), followed by ASA+CLO for 21 days (up to 90 days in	NIHSS \leq 3, ABCD2 \geq 4	Class 1 recommen
	selected patients)	NIHSS 4–5, ABCD2 \leq 3 with symptomatic extra/intracranial stenosis	Class 2b, m consider
	ASA 300 mg + TIC 180 mg, followed by ASA+TIC for 30 days	NIHSS \leq 5, ABCD2 \geq 6 or symptomatic extra/intracranial stenosis	Class 2b, m consider
Minor Stroke or High-Risk TIA \leq 24 h of onset with CYP2C19 LOF allele	ASA 300 mg + TIC 180 mg followed by ASA+TIG for 21 days, and TIC alone from day 22 to 90	NIHSS \leq 3, ABCD2 \geq 4	Class 2b, m consider
		NIHSS \leq 3, ABCD2 \geq 4, and history of recurrent stroke/TIA while on CLO	Class 2 reasona



Patients with acute ischaemic stroke within 4.5 hours of known onset should be considered for thrombolysis with alteplase or tenecteplase. [see 3.5 A]

- Tenecteplase
- Single bolus fibrinolytic agent
- Higher fibrin specificity
- Longer half life (Alteplase 4-5 min vs Tenecteplase 24 min)
- Multiple RCTs and meta-analyses: Tenecteplase is non-inferior to Alteplase, and the recommended dose is 0.25mg/kg



Cautions:

Actilyse²

Alteplase

Hypersensitivity to alteplase, arginine, phosphoric acid, or polysorbate 80

Main advantage is the administration time

https://pro.boehringer-ingelheim.com/uk/products/metalyse-25-mg-tenecteplase/contraindications#Contraindications



Patients with acute ischaemic stroke who were last known to be well more than 4.5 hours earlier should be considered for thrombolysis with alteplase between 4.5-9 hours of known onset, if there is evidence of the potential to salvage brain tissue on CT perfusion or MRI (DWI-FLAIR mismatch). [see 3.5 B]

 treatment can be started between 4.5 and 9 hours of known onset, or within 9 hours of the midpoint of sleep when they have woken with symptoms AND

 they have evidence from CT/MR perfusion (core-perfusion mismatch) or MRI (DWI-FLAIR) mismatch) of the potential to salvage brain tissue (see Table 3.5.1 below). thrombectomy.

Patients with acute ischaemic stroke, regardless of age or stroke severity, who were last known to be well more than 4.5 hours earlier, should be considered for thrombolysis with alteplase if:

- This should be irrespective of whether they have a large artery occlusion and require mechanical

Table 3.5.1 Eligibility criteria for extending thrombolysis to 4.5-9 hours and wake-up stroke

	Time window	Imaging	Imaging criteria
Wake-up stroke	>4.5 hours from last seen well, no upper limit	MRI DWI-FLAIR mismatch	DWI lesion and no FLAIR lesion
Wake-up stroke or unknown onset time	>4.5 hours from last seen well, and within 9 hours of the midpoint of sleep. The midpoint of sleep is the time halfway between going to bed and waking up	CT or MRI core- perfusion mismatch	Suggested: mismatch ratio greater than 1.2, a mismatch volume greater than 10 mL, and an ischaemic core volume <70 mL
Known onset time	4.5-9 hours	CT or MRI core- perfusion mismatch	Suggested: mismatch ratio greater than 1.2, a mismatch volume greater than 10 mL, and an ischaemic core volume <70 mL
[2023]			



MRI DWI - FLAIR mismatch







Core infarct:

Cerebral blood flow (CBF)

Cerebral blood volume (CBV)

Mean transit time (MTT)

Time to peak (Tmax)







Let's remember the criteria:
1) mismatch ratio greater than 1.2
2) a mismatch volume greater than 10 mL
3) an ischaemic core volume <70 mL

Patients eligible for mechanical thrombectomy should receive prior intravenous thrombolysis as rapidly as possible (unless contraindicated), irrespective of whether they have presented to an acute stroke centre or a thrombectomy centre. [see 3.5 F]

- Thrombolysis should not be delayed if the patient is eligible.
- Transfer to a thrombectomy centre (if the patient is eligible) should not be delayed by thrombolysis - another logistical problem solved by tenecteplase!
- Gold standard treatment: tPA + MT



Patients presenting with acute anterior circulation ischaemic stroke and large artery occlusion between 6 and 24 hours previously, including wake-up stroke, should receive mechanical thrombectomy on the basis of a combination of ASPECTS score and target or clinical imaging mismatch. [see 3.5]

- Thrombectomy criteria:
 - First 6 hours:
 - ICA)
 - A disabling neurological deficit = NIHSS score of 6 or more
 - Previously independent (mRS 0-2)

Acute anterior circulation stroke with confirmed large vessel occlusion (proximal MCA/M1,

- First 6 12 hours:
 - ICA)
 - A disabling neurological deficit = NIHSS score of 6 or more
 - No previous disability (mRS 0-1)
 - ASPECTS of 3 or more
- First 12 24 hours:
 - ICA)
 - A disabling neurological deficit = NIHSS score of 6 or more
 - No previous disability (mRS 0-1)

Acute anterior circulation stroke with confirmed large vessel occlusion (proximal MCA/M1,

Acute anterior circulation stroke with confirmed large vessel occlusion (proximal MCA/M1,

ASPECTS of 3 or more <u>AND CT/MRI perfusion mismatch greater than 15 mL</u>

ASPECTS (Alberta Stroke Programme Early CT Score)





Maximum score: 10

Normal brain

Evidence

- **DAWN** trial (2017):
 - 6 hours to 24 hours from onset
 - With clinical mismatch (DWI or CTP RAPID)
 - 1. Age <80 years old, NIHSS >20 and infarct volume of 31 mL to less than 51 mL
 - 2. Age <80 years old, NIHSS >10 and infarct volume <31 mL
 - 3. Age >80 years old, NIHSS >10 and infarct volume <21 mL
 - Anterior circulation
 - Serious adverse events no significant difference, no safety concerns raised.
 - Disability outcomes and functional independence were shown to be better with thrombectomy plus standard medical care vs standard medical care at 90 days.



Evidence

- **DEFUSE** trial (2018):
 - 6 hours to 16 hours from onset
 - With clinical mismatch (DWI or CTP RAPID)

NIHSS > 6, infarct volume < 70 mL, penumbra volume \ge 15 mL and a penumbra/infarct core ratio \ge 1.8

- Anterior circulation
- Rate of functional independence at day 90 was better in the thrombectomy group compared to the best medical therapy group.
- No statistically significant difference in symptomatic intracranial haemorrhage



Thrombectomy for Stroke at 6 to 16 Hours with Selection by Perfusion Imaging. DEFUSE 3 Investigators. N Engl J Med 2018;378:708-718 DOI: 10.1056/NEJMoa



1713973

Since then

- Large Core Trials
- Middle Vessel Trials
- SPEEDY Trial



https://radiopaedia.org/articles/ischaemic-stroke-summary?lang=gb

RESCUE - JAPAN (2023)

Within 6 hours Conducted in Japan Pre-stroke mRS 0-Anterior circulation **ASPECTS 3-5**







SELECT 2 (2023)

International trial

Within 24 hours



ANGEL-ASPECT (2023)

Conducted in China Anterior circulation



Generalized OR, 1.37 (95% CI, 1.11-1.69); P=0.004



Within 24 hours Pre-stroke mRS 0-1 ASPECTS 3-5 + no core limitations ASPECTS 0-2 + infarct core volume of 70-100mL ASPECTS >5 + infarct core volume of 70-100mL

To summarise

- EVT is beneficial in patients with large core, provided;
 - Good premorbid functional levels (mRS 0-1)
 - Age < 80 not enough evidence for age >80 as most of the trials excluded this population or they were underrepresented
 - ASPECTS 3-5 limited data for ASPECTS < 3

Trial name	Baseline imaging	Time window, h	ASPECTS criteria
RESCUE-Japan LIMIT ¹⁸	MRI (14% with CT)	<6*	3–5
ANGEL-ASPECT ¹⁹	CT and CTP (8% with MRI)	<24	3-5†
SELECT2 ²⁰	CT and CTP (2% with MRI)	<24	3-5‡
TESLA ²¹	СТ	<24	2-5
TENSION ²²	CT (18% with MRI)	<11	3-5
LASTE ²³	MRI (16% with CT)	<6.5*	0–5 (4–5 if y)



Since then

- Large Core Trials
- Middle Vessel Trials
- SPEEDY Trial



Middle Vessel Occlusion (MeVO) Trials

- Definition of middle vessel is variable
- Variable tortousity and size, resulting in higher complication rates such as dissection, vasospasm, perforation
- No prior RCT (except M2) -HERMES collaboration

- **DISTAL (2025)**
- DISCOUNT (2025)
 - All negative trials
 - Dominant M2 occlusions with more severe symptoms might benefit from thrombectomy

 - Overall no benefit and safety concerns with higher mortality and adverse effects

ESCAPE (2025)



Since then

- Large Core Trials
- Middle Vessel Trials
- SPEEDY Trial

Specialist pre-hospital redirection for ischaemic stroke thrombectomy (SPEEDY)



Recruiting until 2026

Patients presenting with acute ischaemic stroke in the posterior circulation within 12 hours of onset should be considered for mechanical thrombectomy if they have a confirmed intracranial vertebral or basilar artery occlusion. [see 3.5 K]

should be considered for mechanical thrombectomy (combined with thrombolysis if NIHSS score is 10 or more, combined with a favourable PC-ASPECTS score and Ponsto the paucity of data in these groups. [2023]

Patients with acute ischaemic stroke in the posterior circulation within 12 hours of onset eligible) if they have a confirmed intracranial vertebral or basilar artery occlusion and their Midbrain Index. Caution should be exercised when considering mechanical thrombectomy for patients presenting between 12 and 24 hours of onset and/or over the age of 80 owing

Posterior circulation Acute stroke prognosis early CT score (pc-ASPECTS)



T: thalamus; OL: occipital lobe; M: any part of the midbrain; P: any part of the pons; 1 point each C: cerebellar hemisphere. 2 points 2 points Osamah Alwalid 1 point each 1 point each

Radiopaedia.org

Posterior circulation patients underrepresented in RCTs

No RCTs until BEST (2020) and BASICS (2021)

ATTENTION (2022): patients with BAO

- Conducted in China
- Within 12 hours
- NIHSS ≥ 10
- mRS 0 2 if age < 80 OR mRS 0 if age >80
- PC-ASPECTS ≥ 6 if age < 80 OR PC-ASPECTS ≥ 8 if age > 8

Good Functional Status at 90 Days





Modified Rankin Scale Score of 0-2 at 90 Days



Safety









BAOCHE (2023):

- Conducted in China
- Posterior circulation
- Between 6-24 hours
- NIHSS \geq 10 (extended to include NIHSS \geq 6)
- mrS 0 1
- PC-ASPECTS \geq 6 or Pons-midbrain index \geq 2
- Age >80 was excluded





Safety Outcomes



re	

EUROPEAN STROKE JOURNAL

The impact of large core and late treatment trials: An update on the modelled annual thrombectomy eligibility of UK stroke patients



How have recent thrombectomy trials expanded eligibility criteria by identifying new sub-populations benefiting from the treatment?

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doi.org/10.1177_23969873241232820



What about haemorrhagic stroke?





Patients with acute spontaneous intracerebral haemorrhage with a systolic BP of 150-220 mmHg should be considered for urgent treatment within 6 hours of symptom onset, aiming to achieve a systolic BP of 130-139 mmHg within one hour and sustained for at least 7 days. [see 3.6 C]

- **Royal NHS Trust**
 - Anticoagulation reversal
 - Blood pressure management intense BP lowering within the first 6 hours
- Care pathway (neurosurgical involvement, palliative care involvement, etc)
- Associated with lower 30 day fatality

• The Acute Bundle of Care for Intracerebral Haemorrhage (ABC-ICH) in 2015, by Salford

INTERACT 3 (2023):

- Care bundle approach
 - Early intensive lowering of BP (target <140 mmHg)
 - in those with diabetes)
 - Antipyrexia control (Temp $\leq 37.5^{\circ}$ C)
 - within 1 h of treatment



Strict glucose control (target 6.1–7.8 mmol/L in those without diabetes and 7.8–10.0 mmol/L

• Rapid reversal of warfarin-related anticoagulation (target international normalised ratio <1.5)

Figure 3 Functional outcome at 90 days in the care bundle and usual care groups, according to scores on the mRS

Patients with acute spontaneous intracerebral haemorrhage with a systolic BP of 150-220 mmHg should be considered for urgent treatment within 6 hours of symptom onset, aiming to achieve a systolic BP of 130-139 mmHg within one hour and sustained for at least 7 days. [see 3.6 C]

mmHg within one hour and sustained for at least 7 days, unless:

- the Glasgow Coma Scale score is 5 or less;
- the haematoma is very large and death is expected;
- a macrovascular or structural cause for the haematoma is identified; _
- immediate surgery to evacuate the haematoma is planned, in which case BP should be _ managed according to a locally agreed protocol. [2023]

- Patients with acute spontaneous intracerebral haemorrhage with a systolic BP of 150-220 mmHg should be considered for urgent treatment within 6 hours of symptom onset using a locally agreed protocol for BP lowering, aiming to achieve a systolic BP between 130-139

EUROPEAN Stroke Journal

Acute care bundles should be used for patients with intracerebral haemorrhage: an expert consensus statement



ICH care bundles reduce morbidity and mortality. We review current evidence and make practical recommendations for implementation.

> Stabilise patient, rapid imaging Coagulation tests

Reverse anticoagulant Start intensive BP lowering

SBP < 140, Consult Neurosurgery Achieve T < 37.5°C

Maintain SBP < 140; T < 37.5°C Maintain normoglycaemia

Conclusion



Multiple simultaneous interventions improve functional outcome

Rapid bundled care should be introduced

Quality improvement will help achieve ambitious process targets

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doi.org/

Early non-invasive cerebral angiography (CTA/MRA within 48 hours of onset) should be considered for patients with acute spontaneous intracerebral haemorrhage where a macrovascular cause is likely to be identified. [see 3.6 H]

> Patients with intracerebral haemorrhage in whom the haemorrhage location or other imaging features suggest cerebral venous thrombosis should be investigated urgently with a CT or MR venogram. [2023]





Superior sagittal sinus thrombosis

https://radiopaedia.org/cases/cerebral-venous-sinus-thrombosis-2?lang=gb

The DIAGRAM score (or its components: age; intracerebral haemorrhage location; CTA result where available; and the presence of white matter low attenuation [leukoaraiosis] on the admission non-contrast CT) should be considered to determine the likelihood of an underlying macrovascular cause and the potential benefit of intra-arterial cerebral angiography. [2023]

Dlagnostic AngioGRAphy

to find vascular Malformations

Patient characteristics and NCCT (DIAGRAM score)							
Age 18-50 year	rs			Age 51-70 ye	ears		
	Deen	Lobar	Posterior		Deen	Lobar	Post
	Deeb	LUDai	Fosterior		Deeb	LUDai	FUSIC
			Fossa				FOSS
SVD	2	13		SVD	1	4	1
No SVD	17	55	76	No SVD	6	27	5
Patient charac	teristics	s, NCCT a	nd CTA (DIAG	RAM+ score)			
CTA Negative							
Age 18-50 year	rs			Age 51-70 y	ears		
	Deep	Lobar	Posterior		Deep	Lobar	Poste
			Fossa				Fossa
SVD	1	5		SVD	1	2	4
No SVD	9	29	51	No SVD	3	11	2
CTA Positive							
Age 18-50 year	rs			Age 51-70 y	ears		
5							
	Deep	Lobar	Posterior		Deep	Lobar	Poste
	Deep	Lobar	Posterior Fossa		Deep	Lobar	Poste Fossa
SVD	Deep	Lobar	Posterior Fossa	SVD	Deep	Lobar 17	Poste Fossa
SVD No SVD	Deep 14 56	Lobar 84	Posterior Fossa 93	SVD No SVD	Deep 28	Lobar 17 61	Poste Fossa 34

Low	1-5%
Intermediate	6-25%
High	>25%



Early non-invasive cerebral angiography (CTA/MRA within 48 hours of onset) should be considered for all patients with acute spontaneous intracerebral haemorrhage aged 18-70 years who were independent, without a history of cancer, and not taking an anticoagulant, except if they are aged more than 45 years with hypertension and the haemorrhage is in the basal ganglia, thalamus, or posterior fossa. If this early CTA/MRA is normal or inconclusive, MRI/MRA with susceptibility-weighted imaging (SWI) should be considered at 3 months. Early CTA/MRA and MRI/MRA at 3 months may also be considered in patients not meeting these criteria where the probability of a macrovascular cause is felt to justify further investigation. **[2023]**

Since then

- **ENRICH** trial in 2024 Trial of Early Minimally Invasive Removal of ICH
- Surgical removal vs best medical management of supratentorial ICH
 - Within first 24 hours
 - GCS 5 14
 - NIHSS > 5
 - mRS 0 1
 - 30mL < ICH volume < 80mL
 - Exclusion: substantial intraventricular blood, secondary ICH





Estimated Mean UW-mRS Score at 180 Days



Updates in Practice

Updates in Secondary Prevention

- Home BP monitoring is recommended, SBP target < 125 mmHg
- Aim to reduce fasting LDL < 1.8 mmol/L
- Changes in anticoagulation timing after stroke: OPTIMAS and ELAN trials
 - \leq 48 hours in minor/moderate stroke
 - Day 6 7 for severe stroke



Primary Composite Outcome Events at 30 Days



CONCLUSIONS

In this trial, the incidence of recurrent ischemic stroke, systemic embolism, major extracranial bleeding, symptomatic intracranial hemorrhage, or vascular death at 30 days was estimated to range from 2.8 percentage points lower to 0.5 percentage points higher with early than with later use of DOACs.



Thank you