Royal College of Physicians | Sentinel Stroke National Audit Programme (SSNAP)

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Thrombectomy

Thrombectomy Report for April 2016 - March 2017

National results

July 2017

Based on stroke patients admitted to hospital for thrombectomy between April 2016 and March 2017

Prepared by

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National thrombectomy figures for patients admitted April 2016-March 2017.

Background:

Thrombectomy (intra-arterial intervention) is an emerging treatment in ischaemic stroke. It involves insertion of a guidewire catheter tube into an artery in the groin, and feeding this up into the blocked artery in the brain. The clot is then removed using a mechanical device with the aim of restoring blood and oxygen flow to the brain. If technically successful and done in time thrombectomy can greatly improve the outcome of the brain injury due to stroke in selected patients.

The evidence base for using thrombectomy in treating ischaemic stroke has expanded over the past 2 years but the implications for implementation in routine clinical practice are still emerging. For any service providing thrombectomy, ensuring that treatment is provided safely and effectively is of the highest clinical importance. For this reason SSNAP added questions on thrombectomy provision to the mandatory core dataset on 1 October 2015.

In an individual patient meta-analysis of 5 trials involving 1287 patients (Goyal et al, 2016) endovascular therapy showed significant improvements in functional outcomes at 90 days. The number needed to treat for one additional patient to have reduced disability of at least one point on the mRS was 2.6.

The use of thrombectomy is recommended for selected patients in the RCP National Clinical Guideline for Stroke (2016):

> *Patients with acute ischaemic stroke should be considered for combination intravenous thrombolysis and intra-arterial clot extraction (using stent retriever and/or aspiration techniques) if they have a proximal intracranial large vessel occlusion causing a disabling neurological deficit (National Institutes of Health Stroke Scale [NIHSS] score of 6 or more) and the procedure can begin (arterial puncture) within 5 hours of known onset.*
>
> *Patients with acute ischaemic stroke and a contraindication to intravenous thrombolysis but not to thrombectomy should be considered for intra-arterial clot extraction (using stent retriever and/or aspiration techniques) if they have a proximal intracranial large vessel occlusion causing a disabling neurological deficit (National Institutes of Health Stroke Scale [NIHSS] score of 6 or more) and the procedure can begin (arterial puncture) within 5 hours of known onset.*
>
> *Patients with acute ischaemic stroke causing a disabling neurological deficit (a National Institutes of Health Stroke Scale [NIHSS] score of 6 or more) may be considered for intra-arterial clot extraction (using stent retriever and/or aspiration techniques, with prior intravenous thrombolysis unless contraindicated) beyond an onset-to-arterial puncture time of 5 hours if:*
> *– the large artery occlusion is in the posterior circulation, in which case treatment up to 24 hours after onset may be appropriate;*
> *– a favourable profile on salvageable brain tissue imaging has been proven, in which case treatment up to 12 hours after onset may be appropriate.*

Results:

Between April 2016 and March 2017, it was reported that thrombectomy was started in 580 patients out of 74216 ischaemic stroke patients in England, Wales and Northern Ireland. The device was deployed in 537 of these interventions. Thrombectomy was carried out by 25 teams; the median number of thrombectomies per team was 16 (IQR 9-22). Two of these teams are neuroscience centres which only submit data on thrombectomy patients to SSNAP, as all other stroke care is delivered at other hospitals.

According to the 2016 Acute Organisational Audit 28 sites treated 424 patients with thrombectomy in 2015-2016.

The results below are assigned to the team performing the thrombectomy. Many other hospitals refer onwards to the thrombectomy centre, often after providing some aspects of care such as brain imaging and thrombolysis, but this information is not currently captured in the audit. After thrombectomy, many patients are transferred onwards to their local stroke hospital for further care.

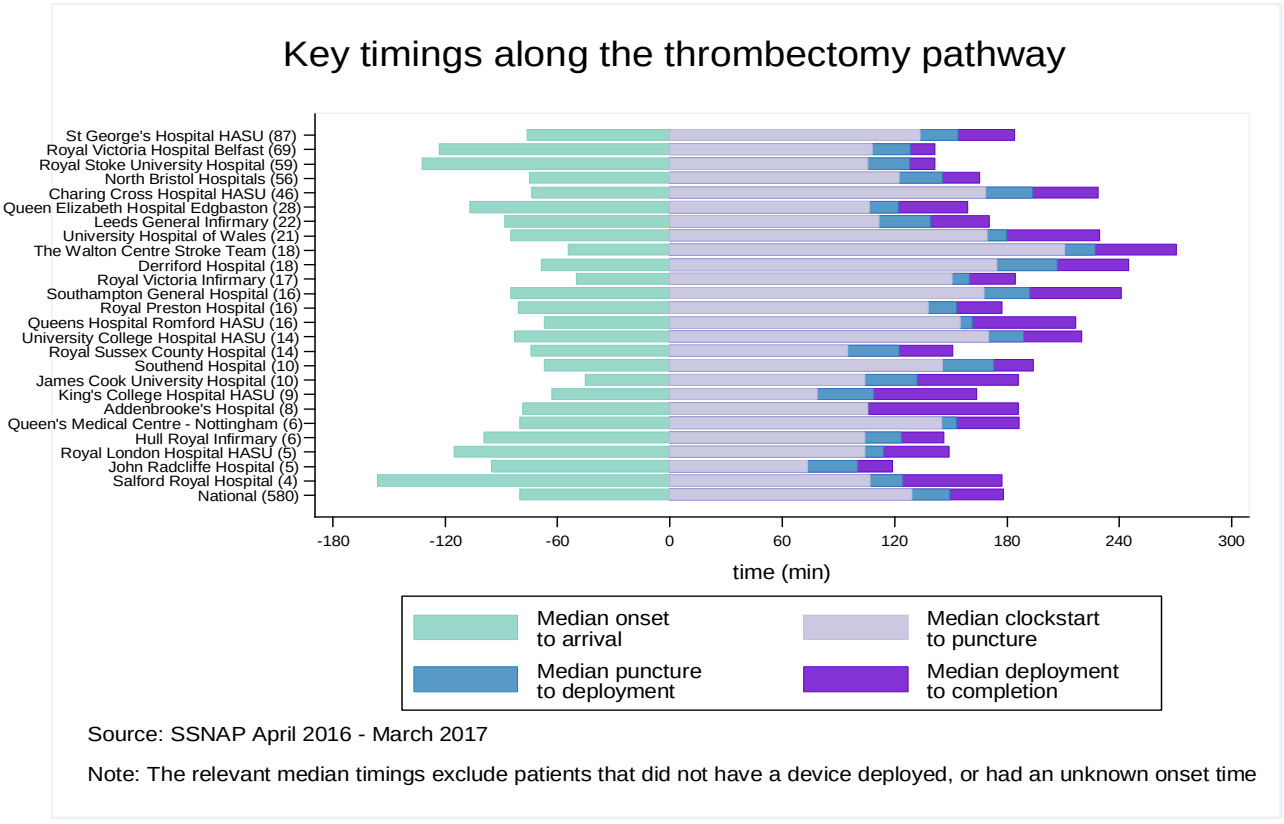
Demographic	SSNAP (n=580)	HERMES (n=634)
Age (years), median (IQR)	68 (56-77)	68 (57-77)
Gender (male)	307 (53%)	330 (52%)
NIHSS arrival, median (IQR)	17 (11-22)¶	17 (14-20)*

*¶n=559 *n=631*

Treatment details	SSNAP (n=580)	HERMES (n=634)
Treatment with intravenous alteplase (tPA)	369 (64%)	526 (83%)
Onset to reperfusion(HERMES)/ completion(SSNAP) (min), median (IQR)	307 (240-374)†	285 (210-362)

†n=500

In the HERMES collaboration pooling data from 5 major trials, the median onset-to-reperfusion was 285 minutes. This is comparable to the onset-to-completion times reported by SSNAP; nationally this is 307 minutes.



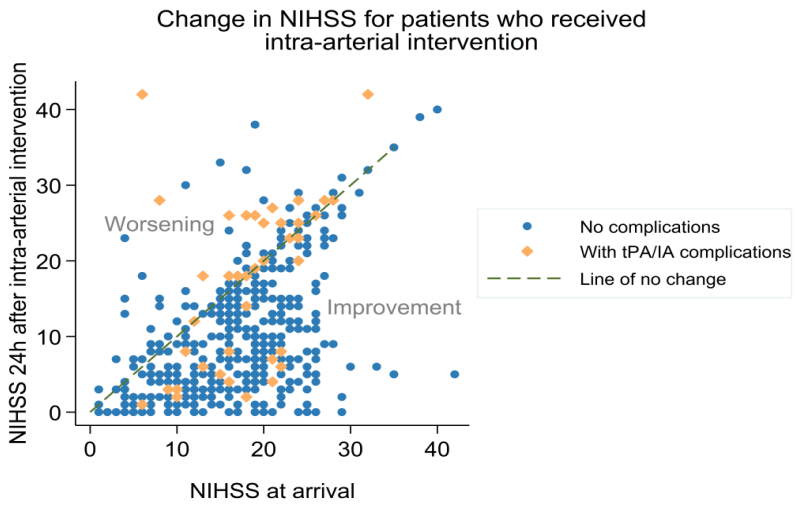
Source: SSNAP April 2016 - March 2017

Note: The relevant median timings exclude patients that did not have a device deployed, or had an unknown onset time

Outcomes	SSNAP (n=512)	HERMES (n=615)
NIHSS 0-2 at 24h	99/512 (19%)	129 (21%)
Mean (SD) NIHSS at 24h	10.5 (8.7)	10.4 (8.7)
Mean (SD) change in NIHSS from baseline to 24h	-6.2 (7.8)**	-6.4 (8.2)
mTICI score 2b/3	441/580 (76%)	402/570 (71%)

***n=498*

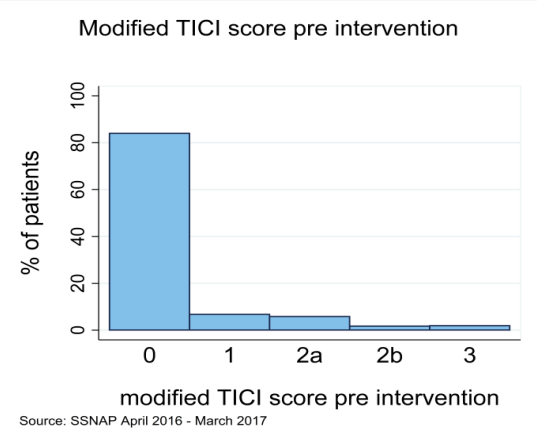
Nationally, 76.3% of patients with the NIHSS recorded on arrival and 24 hours after thrombectomy improved on the NIHSS, with a further 9.4% of patients showing no change.



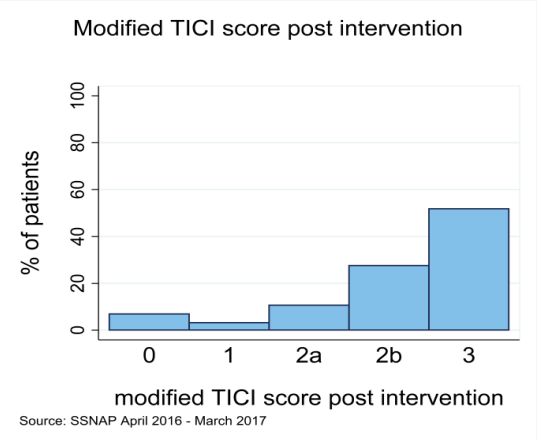
Note: Only patients who have NIHSS on arrival and 24hrs after intra-arterial intervention are includec

Source: SSNAP April 2016 - March 2017

Nationally, 84.3% of patients had an improved modified TICI score post intervention compared with pre intervention, with a further 13.1% showing no change.



Source: SSNAP April 2016 - March 2017



Source: SSNAP April 2016 - March 2017

In depth results are given in the "Data" section of this report at national level. A thrombectomy results portfolio will also be made publically available with team level data for all thrombectomy providers if the team treated at least 10 patients with thrombectomy.

Thrombectomy Output:
Patients admitted April 2016-March 2017 - based on the team conducting the intra-arterial intervention

Category	*Item Reference*	*Item*	*Data type*	*National*
Thrombectomy	*H20.1*	Thrombectomy (all stroke types)	n	580
	H20.2		d	85122
	H20.3		%	<1%
Age breakdown if received thrombectomy	*H21.1*	Denominator	d	580
	H21.2	Age less than 60	n	188
	H21.3		%	32.4
	H21.4	Age 60-69	n	123
	H21.5		%	21.2
	H21.6	Age 70-79	n	165
	H21.7		%	28.4
	H21.8	Age 80-89	n	91
	H21.9		%	15.7
	H21.10	Age 90+	n	13
	H21.11		%	2.2
Gender	*H21.12*	Gender	d	580
	H21.13	Female	n	273
	H21.14		%	47.1
	H21.15	Male	n	307
	H21.16		%	52.9
Atrial Fibrillation (AF) if received thrombectomy	*H21.17*	Known AF prior to stroke	n	130
	H21.18		d	580
	H21.19		%	22.4
	H21.20	If known AF prior to stroke, on anticoagulant	n	70
	H21.21		d	130
	H21.22		%	53.8
Arrival NIHSS if received thrombectomy	*H21.23*	NIHSS at arrival (if fully completed)	Median	17
	H21.24		Lower IQR	11
	H21.25		Upper IQR	22
	H21.26		Mean	16.7
	H21.27	If NIHSS fully completed, NIHSS at arrival:	d	559
	H21.28	0	n	1
	H21.29		%	0.2
	H21.30	1-4	n	21
	H21.31		%	3.8
	H21.32	5-15	n	196
	H21.33		%	35.1
	H21.34	16-20	n	175
	H21.35		%	31.3
	H21.36	21-42	n	166
	H21.37		%	29.7
Brain imaging techniques carried out prior to the intra-arterial intervention	*H22.1*	CTA or MRA	n	553
	H22.2		d	580
	H22.3		%	95.3
	H22.4	Measurement of ASPECTS score	n	311
	H22.5		d	580
	H22.6		%	53.6
	H22.7	Assessment of ischaemic penumbra by perfusion imaging	n	110
	H22.8		d	580
	H22.9		%	19
Thrombolysis if received thrombectomy	*H22.10*	Also received thrombolysis	n	369
	H22.11		d	580
	H22.12		%	63.6
	H22.13	Onset to thrombolysis (if onset is known) (hours:mins)	Median	02:02
	H22.14		Lower IQR	01:35
	H22.15		Upper IQR	02:42

Category	*Item Reference*	*Item*	*Data type*	*National*
Device Deployment	*H23.1*	Deployment of device	n	537
	H23.2		d	580
	H23.3		%	92.6
Timings from onset if received thrombectomy	*H23.4*	Onset to arrival time (if onset is known) (hours:mins)	Median	01:25
	H23.5		Lower IQR	00:59
	H23.6		Upper IQR	02:38
	H23.7	Time from onset to arterial puncture (hours:mins)	Median	03:56
	H23.8		Lower IQR	03:00
	H23.9		Upper IQR	05:10
	H23.10	Time from onset to completion (hours:mins)	Median	05:07
	H23.11		Lower IQR	04:00
	H23.12		Upper IQR	06:14
In-hospital timings if received thrombectomy	*H23.13*	Time from clock start to arterial puncture (hours:mins)	Median	02:10
	H23.14		Lower IQR	01:19
	H23.15		Upper IQR	03:15
	H23.16	Time from arterial puncture to deployment (hours:mins)	Median	00:20
	H23.17		Lower IQR	00:11
	H23.18		Upper IQR	00:32
	H23.19	Time from arterial puncture to end of procedure (hours:mins)	Median	00:56
	H23.20		Lower IQR	00:34
	H23.21		Upper IQR	01:20
	H23.22	Time from clockstart to end of procedure (hours:mins)	Median	03:13
	H23.23		Lower IQR	02:16
	H23.24		Upper IQR	04:24
NIHSS after thrombectomy	*H24.1*	NIHSS 24 hours after thrombectomy is known	n	512
	H24.2		d	580
	H24.3		%	88.3
Change in NIHSS from arrival to 24 hours after thrombectomy (if both arrival NIHSS and 24h NIHSS are known)	*H24.4*	*Denominator*	*d*	498
	H24.5	NIHSS improved	n	380
	H24.6		%	76.3
	H24.7	NIHSS stayed the same	n	47
	H24.8		%	9.4
	H24.9	NIHSS worsened	n	71
	H24.10		%	14.3
	H24.11	*Denominator*	*d*	498
	H24.12	<-12	n	95
	H24.13		%	19.1
	H24.14	-9 to -12	n	83
	H24.15		%	16.7
	H24.16	-5 to -8	n	100
	H24.17		%	20.1
	H24.18	-3 to -4	n	62
	H24.19		%	12.4
	H24.20	-1 to -2	n	40
	H24.21		%	8
	H24.22	no change	n	47
	H24.23		%	9.4
	H24.24	1 to 2	n	36
	H24.25		%	7.2
	H24.26	3 to 4	n	12
	H24.27		%	2.4
	H24.28	5 to 8	n	11
	H24.29		%	2.2
	H24.30	9 to 12	n	5
	H24.31		%	1
	H24.32	>=13	n	7
	H24.33		%	1.4

Category	Item Reference	Item	Data type	National
Thrombectomy and/or thrombolysis complications	*H24.34*	Symptomatic intra-cranial haemorrhage	n	31
	H24.35		d	580
	H24.36		%	5.3
	H24.37	Extra-cranial haemorrhage	n	3
	H24.38		d	580
	H24.39		%	0.5
	H24.40	Other procedural complication resulting in harm to the patient	n	24
	H24.41		d	580
	H24.42		%	4.1
Pre-intervention modified TICI score	*H24.43*	*Denominator*	*d*	580
	H24.44	0	n	478
	H24.45		%	82.4
	H24.46	1	n	39
	H24.47		%	6.7
	H24.48	2a	n	34
	H24.49		%	5.9
	H24.50	2b	n	12
	H24.51		%	2.1
	H24.52	3	n	17
	H24.53		%	2.9
Post-intervention modified TICI score	*H24.54*	*Denominator*	*d*	580
	H24.55	0	n	58
	H24.56		%	10
	H24.57	1	n	19
	H24.58		%	3.3
	H24.59	2a	n	62
	H24.60		%	10.7
	H24.61	2b	n	155
	H24.62		%	26.7
	H24.63	3	n	286
	H24.64		%	49.3
Change in modified TICI score	*H24.65*	*Denominator*	*d*	580
	H24.66	TICI improved	n	489
	H24.67		%	84.3
	H24.68	TICI stayed the same	n	76
	H24.69		%	13.1
	H24.70	TICI worsened	n	15
	H24.71		%	2.6
Clinical trial enrolment	*H25.1*	Enrolment into a clinical trial of intra-arterial intervention	n	37
	H25.2		d	580
	H25.3		%	6.4
Anaesthesia management during the intra-arterial intervention	*H25.4*	*Denominator*	*d*	*580*
	H25.5	Local anaesthetic only (anaesthetist NOT present)	n	125
	H25.6		%	21.6
	H25.7	Local anaesthetic only (anaesthetist present)	n	216
	H25.8		%	37.2
	H25.9	Local anaesthetic and conscious sedation (anaesthetist NOT present)	n	14
	H25.10		%	2.4
	H25.11	Local anaesthetic and conscious sedation (anaesthetist present)	n	77
	H25.12		%	13.3
	H25.13	General anaesthetic	n	145
	H25.14		%	25
	H25.15	Other	n	3
	H25.16		%	0.5

Category	*Item Reference*	*Item*	*Data type*	*National*
Specialty of the lead operator	*H25.17*	*Denominator*	*d*	*580*
	H25.18	Interventional neuroradiologist	n	565
	H25.19		%	97.4
	H25.20	Cardiologist	n	1
	H25.21		%	0.2
	H25.22	Interventional radiologist	n	13
	H25.23		%	2.2
	H25.24	Other	n	1
	H25.25		%	0.2
Use of the following:	*H25.26*	Thrombo-aspiration system	n	423
	H25.27		d	580
	H25.28		%	72.9
	H25.29	Stent retriever	n	337
	H25.30		d	580
	H25.31		%	58.1
	H25.32	Proximal balloon/flow arrest guide	n	69
	H25.33		d	580
	H25.34		%	11.9
	H25.35	Distal access catheter	n	318
	H25.36		d	580
	H25.37		%	54.8
Where the patient was transferred after completion	*H25.38*	*Denominator*	*d*	580
	H25.39	Intensive care unit or high dependency unit	n	130
	H25.40		%	22.4
	H25.41	Stroke unit	n	442
	H25.42		%	76.2
	H25.43	Other	n	8
	H25.44		%	1.4