

An analysis of mechanical thrombectomy services for patients with acute ischaemic stroke at the Walton Centre

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Introduction

Mechanical thrombectomy is clot retrieval procedure that aims to restore normal blood flow to the brain using a device to remove the blood clot blocking the artery. In the UK, there are currently 28 centres performing thrombectomy but only one centre offers the procedure 24 hours a day. The National Institute for Health and Care Excellence (NICE) guidelines have updated literature suggesting thrombectomy should be offered to patients ≤ 24 hours after onset of symptoms compared to current 12-hour recommendations. We looked at our local thrombectomy service in the Walton Centre, Liverpool which is provided from 7am to 5pm every Monday to Friday.

Methods

Data was collected retrospectively (n=48) on patients transferred for thrombectomy to the Walton Centre between May 2017 to September 2018. The patients included were from Merseyside (n=42) and north Wales (n=5), unknown (n=1). The age of patients ranged from 17 to 88 with mean of 69.5. We looked at age, onset to arrival at first hospital, arrival at first hospital to first brain imaging, computed tomography (CT) to CT angiogram, arrival at first hospital to procedure start, onset to procedure start, onset to procedure end, duration of procedure, device type, anaesthetic, National Institutes of Health Stroke Scale (NIHSS) at referral/referring hospital/24 hours, thrombolysis in cerebral infarction (TICI) pre/post intervention, date of procedure, outcome, hyperdense vessel sign and Alberta stroke programme early CT (ASPECT) score.

Results and discussion

Stroke severity is best measured using NIHSS score, this was collected on arrival at the Walton Centre and 24 hours post procedure (Table 1). It was also compared in patients alive and deceased.

Timing intervals

Timing intervals are extremely important in providing the best clinical outcome (Table 2). They are an area that can be continually

Table 1. National Institutes of Health Stroke Scale scores on arrival and 24 hours post procedure

	Mean	Minimum	Maximum
NIHSS on arrival	17.8	7	29
NIHSS 24 hours post procedure	14	0	34

Two were unknown for NIHSS on arrival and 20 were unknown for NIHSS 24 hours post procedure. NIHSS worsened in four patients at 24-hour review. NIHSS = National Institutes of Health Stroke Scale.

enhanced to provide best patient care and ensure that successful recanalisation following thrombectomy is achieved.

Imaging

CTs are used in stroke in order to assess for a hyperdense vessel sign (HVS), ASPECT score and tissue viability. The HVS was found in 34, 10 did not and four were unknown. Thirteen had an ASPECT score of <7 , 33 with a score of 7–9 and zero with a score of 10. The minimum score was 6 and maximum was 9 with a mean of 7.5. Table 3 shows the ASPECT score and HVS combined.

Table 2. Time intervals from Walton Centre data in minutes

	Mean	Minimum	Maximum
Onset to arrival at first hospital	85.04	0	420
Arrival at first hospital to first brain imaging	32.06	8	120
Arrival at first hospital to procedure start	218	108	552
Arrival at Walton Centre to procedure start	24.03	5	74
Onset to procedure start	306.39	125	980
Duration of procedure	51.23	16	125

For onset to arrival at first hospital the second longest patient was 232 minutes, the average after accounting for this was mean = 75.93. For arrival at Walton Centre to procedure start, 18 were not known and five did not have the procedure performed.

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Table 3. Alberta stroke programme early computed tomography score and hyperdense vessel sign

Patients with/without hyperdense vessel sign in correlation with ASPECT score			
	Yes	No	N/A
ASPECT score <7	10	11	1
ASPECT score = 7–9	23	7	3
ASPECT score = 10	0	0	0

ASPECT = Alberta stroke programme early computed tomography.

Recanalisation

Fig 1 shows 48 TICI scores pre/post intervention with thrombectomy.

Problems after thrombectomy

No recording was made on patient incidence of significant intracerebral haemorrhage but CT was performed within 36 hours of thrombectomy at the Walton Centre unless the patient had died or they did not receive thrombectomy. After stroke/thrombectomy the data showed that 16 patients died, mean = 72.93. The time of death is shown in Table 4; however, cause of death has not been documented.

Conclusion

The aim of any intervention including thrombectomy in acute ischaemic stroke patients is to improve patients' quality of life (QoL) and mortality. The modified Rankin Scale data were missing in the data set, for future studies this scoring could be provided in order to have more evidence for QoL after stroke.

The Walton Centre data show that the majority of patients who had thrombectomy (n=33) had an ASPECTS between 7–10. However, three had a score ≤5. Sixty-six per cent of these patients died within 10 days after thrombectomy. None had an ASPECTS of 10, perhaps a score of this magnitude is so severe that thrombectomy would not improve outcomes. Thirty-four had a hyperdense vessel sign compared to 10 without. This could be a potentially important trigger for which patients should receive thrombectomy.

Table 4. Deaths of patients after stroke/thrombectomy in days.

Day	Number of patients
<3 days	2
4–7 days	6
8–10 days	4
11–30 days	1
>30 days	3

The Walton Centre data show 36 (75%) had a TICI score of ≥2b after procedure compared to none before intervention. Although some patients remained at scores of 0 (n=4), 1 (n=2) and 2a (n=6), there is clear indication that the Walton Centre is producing successful results after recanalisation and is therefore selecting the right patients for mechanical thrombectomy. ■

References

- 1 National Institute for Health and Care Excellence. *Mechanical clot retrieval for treating acute ischaemic stroke. Interventional procedures guidance [IPG458]*. London: NICE, 2013.
- 2 Albers GW, Marks MP, Kemp S *et al*. Thrombectomy for stroke at 6 to 16 hours with selection by perfusion imaging. *N Engl J Med* 2018;378:708–18.
- 3 Goyal M, Menon BK, van Zwam WH *et al*. Endovascular thrombectomy after large-vessel ischaemic stroke: a meta-analysis of individual patient data from five randomised trials. *Lancet* 2016;387:1723–31.
- 4 Sacks D, Baxter B, Campbell BCV *et al*. Multisociety consensus quality improvement revised consensus statement for endovascular therapy of acute ischemic stroke. *AJNR Am J Neuroradiol* 2018.
- 5 Chandran A, Wilson M, Ellis R *et al*. *Adult stroke intra-arterial thrombectomy policy guideline for referral*. Liverpool: The Walton Centre, 2018.

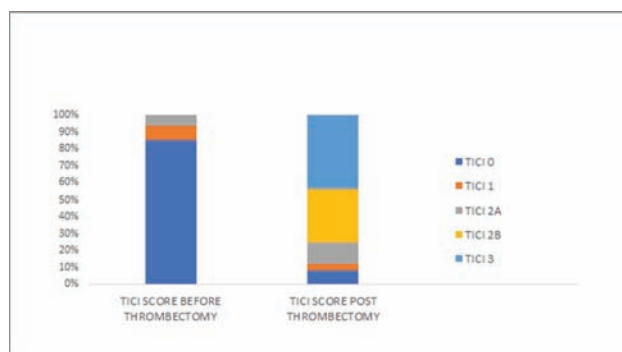


Fig 1. TICI scores pre/post thrombectomy