

# WHEN TO TRANSFER PATIENTS WITH GASTROINTESTINAL BLEEDING FOR ANGIO-EMBOLISATION

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## INTRODUCTION

Angioembolisation (AE) is a useful therapeutic tool for the management of lower gastrointestinal bleeding (LGIB) for management of acute bleeding and decreasing rates of recurrent bleeding<sup>1</sup>, however, it is only available in hospitals with specialist interventional radiology services. AE performed less than 120-150min after positive CT mesenteric angiogram (CTMA) results in better localization of the bleeding point and more likely to result in successful AE<sup>2,3,4</sup>. There are often significant delays when organizing patient transfers between hospitals due to factors such as delay in reporting of imaging and bed and transport availabilities. Approximately one quarter of patients transferred from a peripheral hospital received angiography at the receiving hospital<sup>5</sup> so therefore a significant proportion of patients do not receive AE after transfer. In addition to this, interhospital transfers represents a significant cost burden to the health care system.<sup>6</sup>

## OBJECTIVES

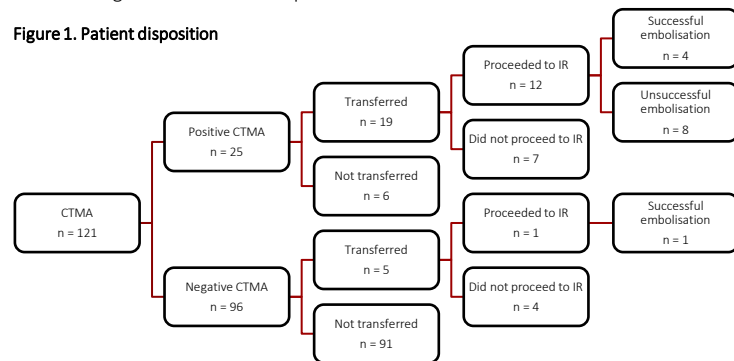
This study sought to delineate the factors associated with successful versus unsuccessful AE after transfer from a peripheral hospital of patients with LGIB who had positive CTMA.

## METHODS

Retrospective review of adults undergoing CTMA for gastrointestinal bleeding at a peripheral hospital in NSW between January 2014 and June 2017. Patient demographics, clinical status (including haemodynamic observations and laboratory values), incidence of transfer, time to transfer, time to AE and success of AE were analyzed.

Data were recorded and analysed using Jamovi software. Descriptive statistics were computed. Distribution of continuous data was tested for normality using the Shapiro-Wilk test. Mann-Whitney U tests were performed to assess differences in patient age, haemodynamics and Hb between patients who were transferred, who underwent AE or who had successful embolization. Mann-Whitney U tests were also used to assess differences in time from CTMA to embolization and time from arrival at the receiving hospital to embolization for patients with successful and unsuccessful embolization. Statistical significance was set at  $p < 0.05$ .

Figure 1. Patient disposition



## RESULTS

A total of 121 patients underwent CTMA at the study hospital for gastrointestinal bleeding. Median age was 68 years (range 23 to 95 years), 54.5% were male and 47.9% were female. 46.3% were not on any antiplatelets/anticoagulants, 47.9% were on antiplatelets/anticoagulants and 5.8% had unknown medication history. Blood product transfusion was required for 59.5% of patients (56.2% of patients with negative CTMA versus 72% of patients with positive CTMA). There were 25 positive CTMAs (20.7%) and 96 negative CTMAs (79.3%). 24 patients were transferred to a tertiary hospital (19.8%) with view to undergo embolisation and 97 patients were not transferred (80.2%).

Of the patients transferred to the tertiary hospital for AE, 13 patients were embolized. 5 were successful (38.5%) and 8 were unsuccessful (61.5%) meaning no active bleed was identified on angiography (Figure 1). Of the 11 transferred patients who did not undergo angiography, 3 patients had spontaneous resolution of bleeding, 3 patients had no bleeding found on repeat CTMA, 1 patient deteriorated and was deceased prior to angiography and 4 were unclear. Of the 8 patients who did not have successful embolization, 2 had repeat AE, 4 underwent gastroscopy and 1 underwent colonoscopy.

Characteristics of patients based on transfer status are demonstrated in table 1. There was a significant difference in patient age between the transferred and non transferred groups ( $p=0.015$ ). A significantly higher proportion of transferred patients received blood transfusion (82.6% versus 55.2% of non transferred patients,  $p=0.016$ ). There were no significant differences in HR, SBP, Hb and lactate between transferred and non-transferred groups.

Table 1. Characteristics of study population by transfer status\*:

	Transferred n = 24	Not Transferred n = 97	P value**
<b>Sex</b>			
Male	16 (66.7)	50 (51.5)	0.015
Age (years)	77.5 (19.3)	68.0 (22.0)	0.435
<b>Vitals</b>			
Heart rate	82 (27)	85 (27)	0.576
Systolic blood pressure (mm Hg)	117 (33)	122 (29)	0.457
Hb	95 (36)	98 (43)	0.471
Lactate	1.70 (1.19)	1.69 (1.15)	0.618
<b>Antiplatelet/anticoagulant therapy</b>			
Yes	12 (54.5)	46 (50.0)	0.702
No	10 (45.5)	46 (50.0)	
<b>Packed red blood cell transfusion</b>			
No	4 (17.4)	43 (44.8)	0.016
Yes	19 (82.6)	53 (55.2)	
<b>CTMA</b>			
Positive	19	6	-
Negative	5	91	

\* Discrete data expressed as n (%), continuous data expressed as median (IQR)  
\*\*  $\chi^2$  P value for discrete data, Mann-Whitney U-test for continuous data

Patients who had unsuccessful AE had a significantly longer time from arrival at the tertiary hospital to AE compared to patients who had successful AE (mean 375 versus 175 minutes,  $p=0.001$ ). However, they also had an overall longer mean time from CTMA to transfer and CTMA to embolization. There were no significant other significant differences in characteristics found (table 2).

Table 2. Characteristics of patients who had successful versus unsuccessful embolization:

	Successful Embolisation n = 5	Unsuccessful Embolisation n = 8	Mean difference	P value**
<b>Sex</b>				
Male	3 (60.0)	5 (62.5)	-	0.928
Age (years)	65.0 (21.0)	75.5 (23.0)	-	0.908
<b>Vitals</b>				
Heart rate	82 (4)	86 (40)	-	1.000
Systolic blood pressure (mm Hg)	103 (22)	121 (30)	-	0.475
Hb	78 (13)	113 (41)	-	0.106
Lactate	2.39 (0.96)	1.06 (0.67)	-	0.095
<b>Antiplatelet/anticoagulant therapy</b>				
Yes	1 (33.3)	4 (50.0)	-	0.621
No	2 (66.7)	4 (50.0)	-	
<b>Packed red blood cell transfusion</b>				
No	0 (0.0)	2 (28.6)	-	0.190
Yes	5 (100.0)	5 (71.4)	-	
<b>Mean time (minutes)</b>				
Time from CTMA to transfer	531 (+/- 250)	148 (+/- 25)	383	0.002
Time from CTMA to embolisation	681 (+/- 348)	552 (+/- 304)	129	0.622
Time in transit	45 (+/- 22)	30 (+/- 7)	15	0.368
Time from arrival at receiving hospital to embolisation	175 (+/- 63)	375 (+/- 295)	200	0.001

\* Discrete data expressed as n (%); age, vitals, Hb and lactate expressed as median (IQR); times expressed as mean (n minutes) +/- SD  
\*\*  $\chi^2$  P value for discrete data, Mann-Whitney U-test for continuous data

## CONCLUSIONS

A significant proportion of patients transferred for AE either did not proceed to embolization or had no active bleed at time of embolization. This presents a cost burden to the healthcare system and warrants the development of protocols to guide patient selection and expedite transfer. One significant finding however was the difference in time from patient arrival to angiography resulting in successful compared to unsuccessful AE, which in part highlights the need to consider timing when treating significant LGIB. This study demonstrates that the primary delays in AE occur between CTMA and transfer and after arrival at the receiving hospital, which cumulatively result in a timeframe much longer than the recommended 120-150 minutes between positive CTMA and AE. This poses issues when patients present with LGIB to a peripheral hospital without AE facilities and represents an area in our healthcare system that requires improvement. Another salient finding of this study is that no association was identified between successful embolization and patient haemodynamic, laboratory parameters or need for blood transfusion. This is likely to be largely related to small sample size, and such factors may be further elicited by a larger study in order to better inform protocols for management and transfer of these patients.

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