Bolusing intravenous administration sets with monoclonal antibodies reduces chair time in the oncology outpatient setting:

Results of a randomised control trial

Francesca Boyte[1], Brighid Scanlon[1,2], Robyn Matthews[1], Elise Button[1], Lee Jones[1], Therese Hayes[1], Grant Partridge[1], Michael Smith[1], Glen Kennedy[1], Melissa Eastgate[1],Nicole C Gavin[1,3]

1. Cancer Care Services, Royal Brisbane and Women's Hospital, Herston, QLD, Australia **2.** Queensland University of Technology School of Public Health, Kelvin Grove, QLD, Australia **3.** Queensland University of Technology School of Nursing and the Metro North Health Nursing and Midwifery Academy, Herston, QLD, Australia

Introduction:

Monoclonal antibody drugs are widely used anti-cancer therapies in the oncology outpatient setting. Increasing demand for outpatient cancer care necessitates exploration of improvements in efficiency. Limited literature has investigated the impacts of bolusing intravenous administration sets with monoclonal antibodies on chair time and associated cost.

We hypothesised that bolusing IV administration sets with monoclonal antibodies would be a safe and efficient method to reduce chair time and associated cost in the oncology outpatient setting. See **Figure 1**.

Objectives/Aims:

Primary objective: to evaluate the impact on chair time and associated cost of bolusing intravenous administration sets with prescribed monoclonal antibodies, compared to a compatible fluid. A secondary objective was to assess the incidence of hypersensitivity reactions associated with this practice.

Description/Methodology:

A randomised controlled trial (n=128), with a two-arm design (monoclonal antibody bolus versus priming with a compatible fluid i.e., 0.9% sodium chloride) at a major, quaternary hospital in metropolitan Brisbane, Australia. Included monoclonal antibodies were daratumumab, obinutuzumab, pembrolizumab and nivolumab.

Cost per minute of chair time were calculated from the National Efficient Price Determination 2023 for 'chemotherapy – treatment'.

Results/Outcomes:

From July 2021 to January 2022, 52 patients were recruited, representing 128 episodes of care. See **Figure 2** and **Table 1**. There was a statistically significant reduction in chair time for obinutuzumab (16-minute reduction; P=0.032), pembrolizumab (7-minute reduction; P=‹0.001) and nivolumab (7-minute reduction; P=‹0.001) compared to priming with a compatible fluid. See **Table 2**.

This led to a cost saving of $46.40, $20.30, and $20.30 (AUD) per infusion respectively, for these three monoclonal antibodies. See **Table 3**. There was no statistically significant difference in frequency of hypersensitivity reactions between study arms.

Table 1: Participant characteristics

Characteristic	Control (*n*=64)		Intervention (*n*=64)	
	$\bar{x}$	SD	$\bar{x}$	SD
Age (Years)	64	16.8	66	14.4
Characteristic	***n***	**%**	***n***	**%**
Sex (Male)	43	33	49	77
Diagnosis				
Haematology	36	56	34	53
Medical Oncology	28	44	30	47
Planned treatment				
daratumumab	16	25	16	25
obinutuzumab	16	25	16	25
pembrolizumab	16	25	16	25
nivolumab	16	25	16	25
Treatment cycle				
1	15	23	16	25
2	2	3	1	1
3+	47	74	47	74
Vascular Access Device				
PIVC	54	84	57	89
CVAD	10	16	7	11
Hypersensitivity reaction				
Yes	0	0	2	3
No	64	100	62	97

Table 2: Mean chair time

	Group	Mean	95% CI	Ratio	95% CI	p-value
daratumumab	control	223.66	(183.02, 273.33)	1.00		
	intervention	216.77	(183.18, 256.53)	0.97	(0.88, 1.07)	0.523
obinutuzumab	control	262.19	(254.14, 270.51)	1.00		
	intervention	246.26	(230.76, 262.79)	0.94	(0.89, 0.99)	0.032
pembrolizumab	control	46.09	(43.26, 49.11)	1.00		
	intervention	38.69	(36.75, 40.73)	0.84	(0.77, 0.91)	<0.001
nivolumab	control	46.61	(44.71, 48.59)	1.00		
	intervention	39.45	(38.63, 40.29)	0.85	(0.81, 0.88)	<0.001

Table 3: Chair time and cost for intervention and control

Drug	Difference between mean chair times (mins)	Chair time cost per minute* (AUD)	Cost saving Ix v C (AUD)
daratumumab	6.9	$2.90 per minute	NS
obinutuzumab	16.0		$46.40
pembrolizumab	7.0		$20.30
nivolumab	7.0		$20.30

Figure 1: Bolusing practice for intervention group

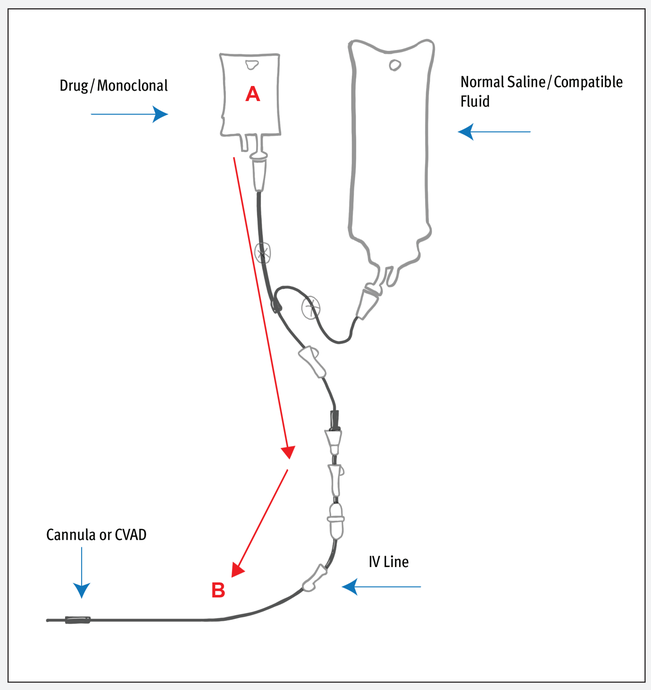
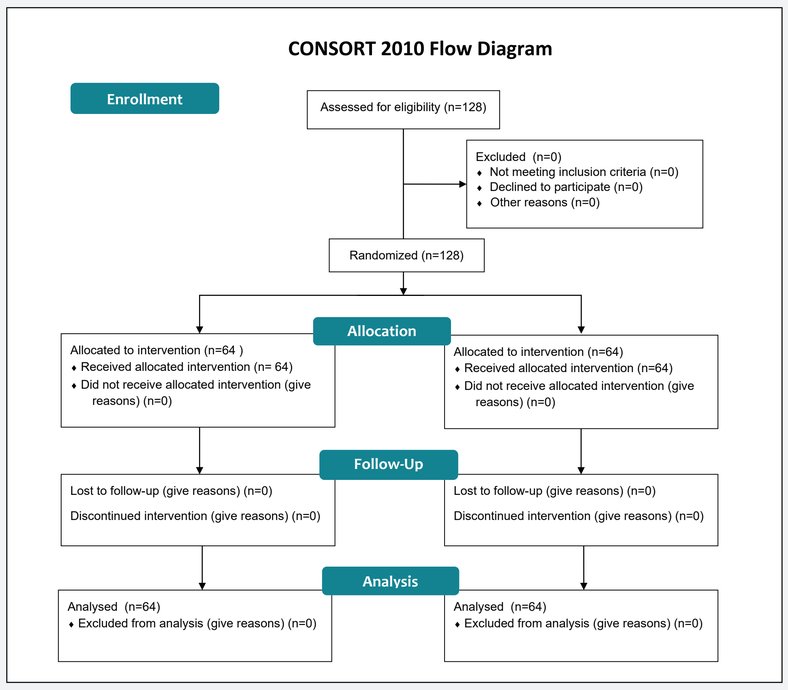


Figure 2: Consort Flow Diagram



Conclusion:

Findings suggest that bolusing IV administration sets with a prescribed monoclonal antibody drug could reduce chair time and cost in busy oncology outpatient settings. A powered study to assess the incidence of hypersensitivity reactions related to this practice is recommended.

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