

# Optimising delivery of intensive blood pressure lowering: experience at a UK comprehensive stroke centre and association with survival and kidney injury

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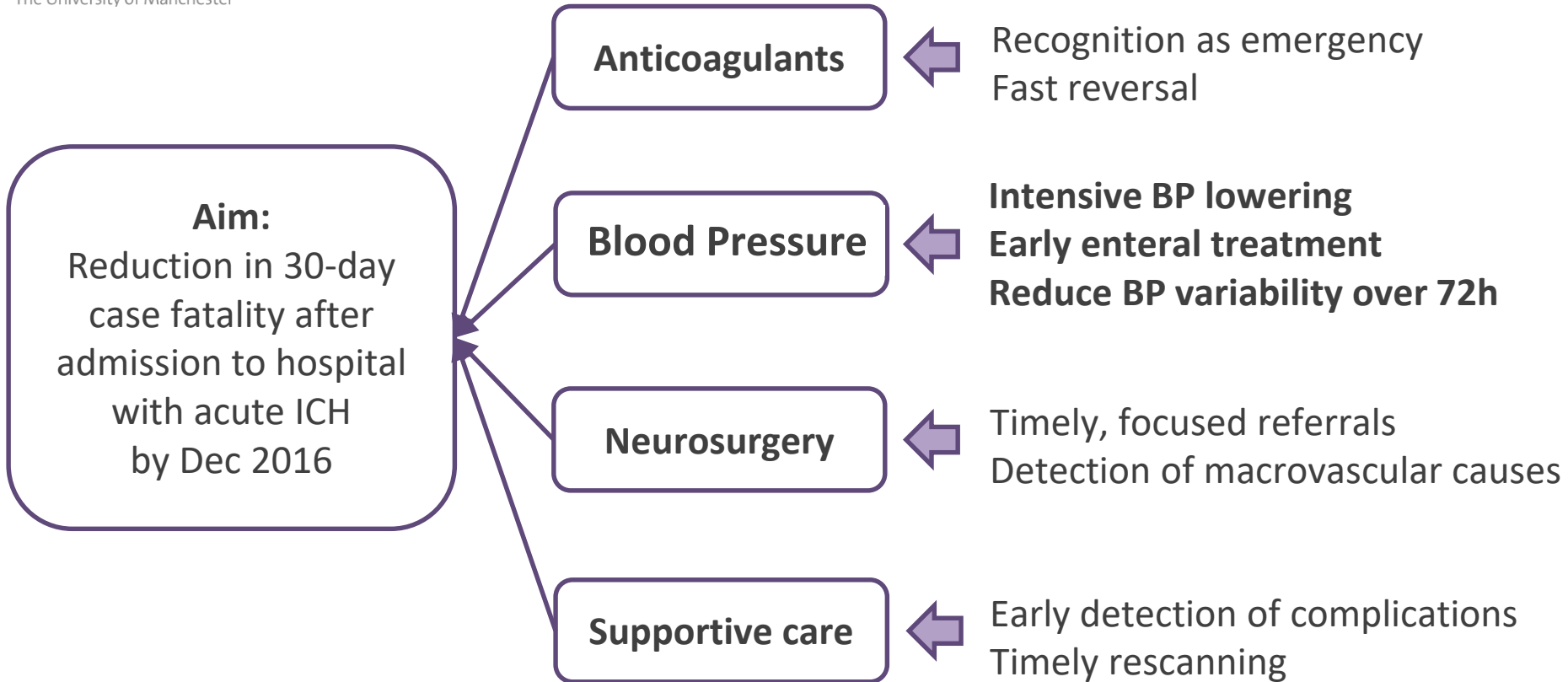
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# Intensive blood pressure lowering in ICH

- **INTERACT2 (2013)**  
Target SBP 130-140 mmHg within 1h  
Improved functional outcomes on ordinal shift analysis  
No difference in SAEs
- **ATACH2 (2016)**  
Target SBP 110-139 vs 140-179 mmHg within 2h  
Neutral on all outcomes  
Increased renal AEs (9.0% vs. 4.0%,  $p=0.002$ )

# Methods

- **Design:** Quality improvement project using Model for Improvement
- **Aim:** Reduce 30-day case fatality after admission with acute ICH
- **Setting:** Salford Royal NHS Foundation Trust, UK
- **Dates of QI project:** Jun 2015 – Jun 2016
- **Patients:** All consecutive admissions with spontaneous ICH; case ascertainment via coding June 2013 - Jan 2017
- **Data collection:** Demographics, baseline characteristics, acute management, imaging, renal function, survival



# Intensive blood pressure lowering protocol

**Aim:** Deliver intensive blood pressure lowering to target 130-140 mmHg with a needle-to-target time of less than 60 min

## Key changes

Standardised protocol introduced Jun 2015:

- IV GTN monotherapy as first line for 30 min, then adding IV labetalol boluses
- Referral to critical care if not controlled by 60 min
- Transition to enteral treatment within 24 h

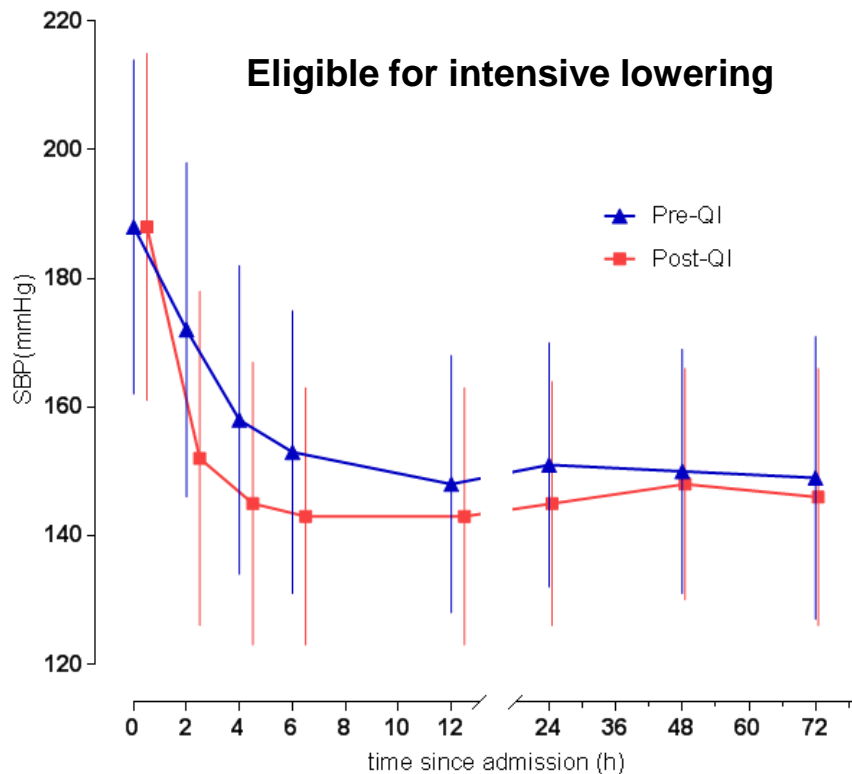
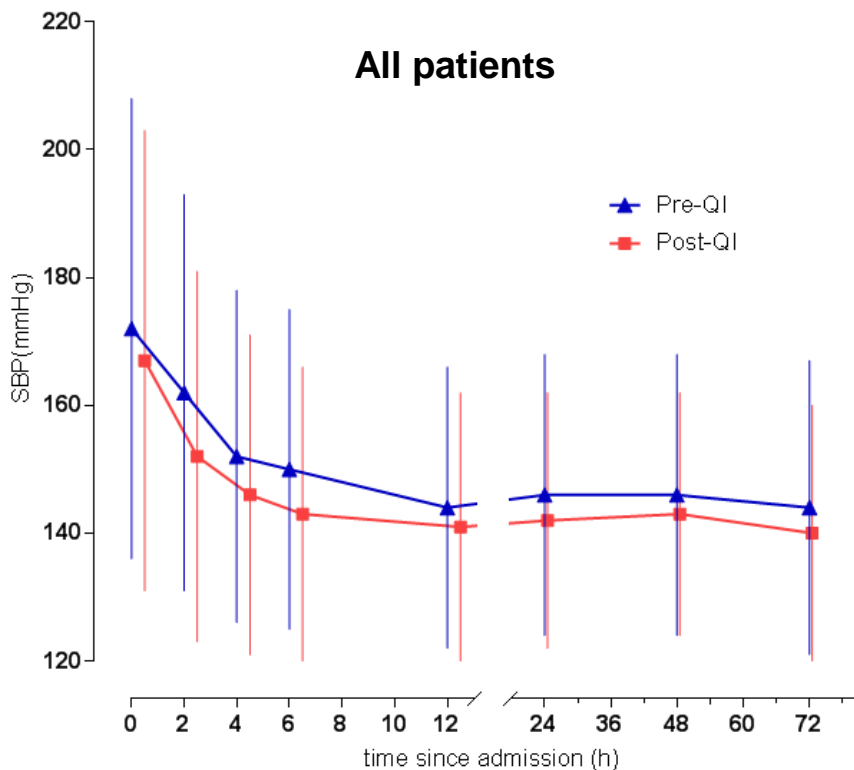
## Baseline characteristics

Factor	Pre QI (n=372)	Post QI (n=423)	p
Age	71.7 (57.0 – 81.2)	70.4 (56.3 – 80.2)	0.83
Premorbid mRS (0-2)	289 (79.6%)	260 (82.3%)	0.20
Anticoagulant	53 (14.2%)	55 (13.0%)	0.61
Sex (female)	179 (48.1%)	189 (47.7%)	0.91
GCS	14 (10-15)	14 (10-15)	0.85
Infratentorial	46 (12.4%)	51 (12.1%)	0.89
IVH	144 (38.7%)	159 (37.9%)	0.55
ICH volume (ml)	17.3 (6.2 – 48.3)	16.7 (5.3 – 42.3)	0.36

Pre QI: Jun 2013 – May 2015; post QI: Jun 2015 – Jan 2017. Excluded 33 cases not admitted under stroke or neurosurgery (22 pre, 33 post)

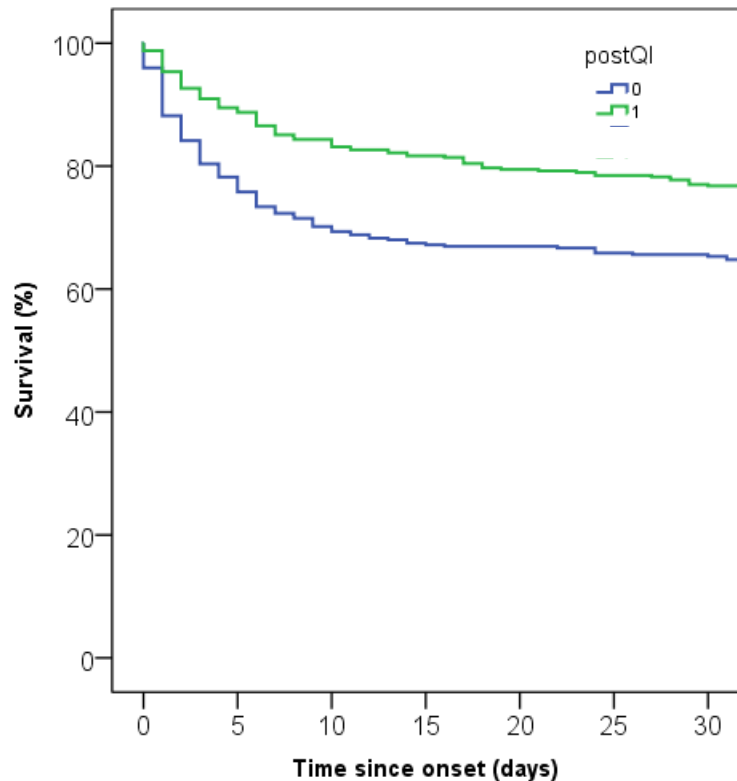
# Blood pressure

	Pre QI (n=372)	Post QI (n=423)	p
Eligible for int. lowering	200 (54%)	150 (36%)	<0.0001
Received int. lowering (as % of eligible)	98 (49%)	106 (71%)	<0.0001
Labetalol	77 (21%)	62 (15%)	0.027
GTN	82 (23%)	161 (38%)	<0.0001
Critical Care	69 (19%)	124 (29%)	0.001
NTT (min) median (IQR)	365 (211-1080)	65 (35-252)	<0.0001
Mean over 72 h	150.3 (136.8-161.8)	142.0 (133.4 – 153.6)	<0.0001
SD over 72 h	16.2 (11.1-22.4)	15.4 (11.1 – 20.5)	0.109
AKI			
Yes	9 (2.4%)	13 (3.1%)	p=0.512
No	193	189	
Unknown	170	221	





# Unadjusted analysis of survival



## Pre-QI:

- Jun 2013 – May 2015
- 372 cases admitted
- 30-day case fatality = 34.7%

## Post-QI:

- Jun 2015 – Jan 2017
- 423 cases admitted
- 30-day case fatality = 23.2%

Logrank test: **p=0.001**

## Cox regression analysis

Factor	HR	95% CI	Sig.
GCS	0.88	0.85 to 0.91	<0.0001
Anticoagulant	1.36	1.01 to 1.83	0.04
Infratentorial	1.94	1.40 to 2.69	<0.0001
IVH	1.37	1.07 to 1.75	0.013
ICH vol	1.009	1.007 to 1.011	<0.0001
Age	1.052	1.043 to 1.062	<0.0001
<b>Post QI</b>	<b>0.65</b>	<b>0.51 to 0.83</b>	<b>0.001</b>
Post QI (unadj)	0.68	0.54 to 0.86	0.001

# Conclusion

- Successful implementation of intense BP lowering to target 130-140 mmHg in 60 min
- 11.5 pp (33% relative) reduction in 30 day case fatality after implementation of ABC-ICH bundle, independent of case mix
- No evidence of increased AKI with available lab data

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