

Clinical Question

P: In trauma patients suffering from significant hemorrhage

I: Is hypotensive Resuscitation

C: Compared to Normotensive Resuscitation

O: Associated with improved Mortality

Clinical Scenario:

11pm on Friday evening, you are on the trauma service.... Trauma Alert, Alpha team stat. A 24 year old male was minding his own business in Norfolk when he was shot through his right side. EMS arrives with 2 large bore IV in his antecubital fossae and, according to ATLS, have two bags of saline running “wide open”. Pt arrives with a BP of 95/50 so your nurse quickly puts the pressure bags on the 2 liters already running in...

Background:

1918- Cannon considered the administration of fluid to a person with an open wound dangerous as “if the pressure is raised...blood that is sorely needed may be lost”

WWII - No IV fluid before surgical control

1950’s – Wiggers shows that outcome is improved after significant hemorrhage with administration of IV fluids. Studies performed on controlled hemorrhage.

Present Day – multiple animal studies (pigs, rats) showing decreased mortality with limited resuscitation in uncontrolled hemorrhage.

Author	Study Type	Population	Study Design	Outcome	Pros/Cons
Bickell, 1994	PR	Adults with Penetrating Torso injuries	598 patients 289 – delayed resuscitation 309 – immediate fluid resus	70% in delayed survived to discharge compared to 62% of immediate	Pro – PR Con – limited population NO fluid resus in exp group
Sampalis, 1997	Obsrv	Trauma pts in Montreal with PHI >3 and alive	Data collection IV vs no IV, prehospital time, PHI, with	OR of dying with on scene IVF 2.33 (even with correcting for	Pro – large pt population Con – observ, selection bias

		upon arrival to hospital	subsequent stat analysis	time and PHI)	
Hambly, 1996	Retro	Trauma pts resuscitated with the Rapid Infusion System	527 trauma patient resuscitated with RIS compared to the expected mortality from the STC Trauma Registry	Decreased survival with RIS (52.9% vs 61.8%), if given >6L via RIS Survival was 37.2% vs 57.2%	Pro – large pop Con – not prehospital, retrospect compared to theoretical control
Dutton, 2002	PR	Trauma pt SBP<90 Ongoing blood loss	110 pts total ½ resus to SBP >100 ½ to SBP 70 until control of bleeding	Survival rate equal (92.7%)	Pro – PR Con – small pop, goal not met (actual SBP in hypotensive group 100, in control 114)
Revell, 2002	Csns	A consensus meeting (UK)	>50 papers evaluated, then “expert opinion” discussed	Boluses of 250cc should be titrated against a radial pulse	Pro - “expert” Con – not a study, opinion only

Conclusion:

Cochrane says: Not sufficient evidence – more studies need to be done

I say: No great evidence for what we do now, animal studies show improved survival with hypotensive resuscitation and human studies at this point fail to show any harm with hypotensive resuscitation. Therefore resuscitation to less than normal blood pressure is appropriate in actively bleeding trauma.

Dr. Reed says: MAP of 60 is all you need, as long as they are mentating, no need to give aggressi¹ve fluid resuscitation.

¹ PR – prospective randomized, Obsrv – observational, OR – odds ratio, PHI – prehospital index, Retro – retrospective, Csns - consensus