

Restrictive or Liberal Transfusion Strategy in Myocardial Infarction and Anemia

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MEDICINE

Transfusion strategy uncertainty

- Anemia is common in patients with acute myocardial infarction
- Should we give a blood transfusion? What hemoglobin threshold?
 - Risks, unclear benefit
 - **Blood is a limited resource**
- Lack of evidence to guide the practice
 - Prior small trials → inconclusive results
 - Largest → restrictive transfusion is not inferior to liberal



Pros

- May decrease ischemic injury
- Improve oxygen delivery
- May prevent future ischemic injury and death

Cons

- Fluid overload
- Infection from exposure to blood borne microorganisms
- Immunosuppression



The MINT Trial: Myocardial Ischemia and Transfusion

- Phase 3 interventional
- 144 sites
 - US, Canada, France, Brazil, NZ, Australia
- Primary Objective: Determine the risk of death or Myocardial Infarction through 30 days in Restrictive/ Liberal transfusion groups



Liberal

- 10 g/dL or above
- *Delayed in patients with volume overload

Restrictive

- 8 g/dL
- *Or if angina symptoms clearly related to the anemia occur and are not controlled with anti-anginal medications

Unmasked to investigators and patients after randomization

Throughout index hospitalization (up to 30 days)

Protocol progressed at discretion of attending physician*

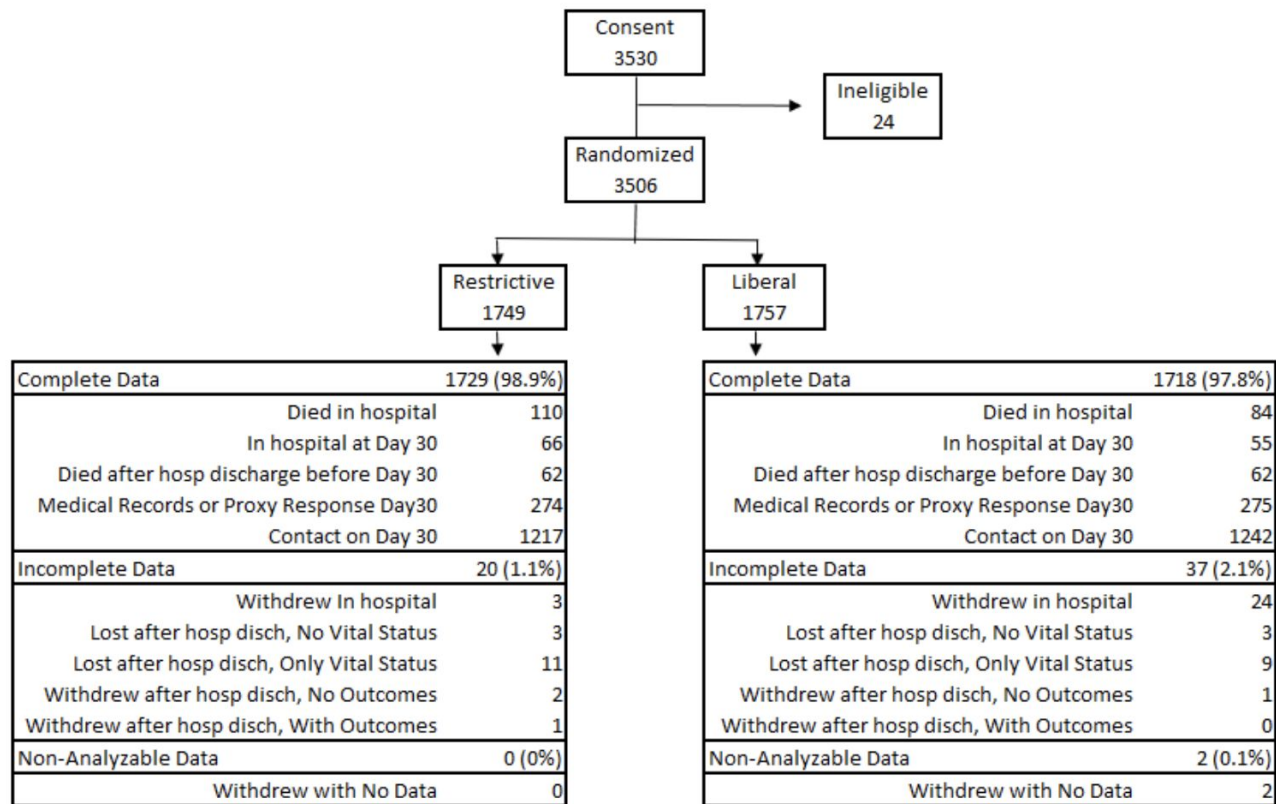


Assessment

- Primary outcome
 - MI or death at 30 days
- Secondary outcome
 - Composite outcome of death, MI, ischemia driven unscheduled coronary revascularization, readmission to the hospital for cardiac condition
 - Cause of death: cardiac, non cardiac, undetermined



Patient Selection



Trial Population

- Mean age: 72
- 45.5% Women, 54.5% Men
- 55.8% type 2, 41.7% type 1
- Pre rand. Mean Hb 8.6g/dL
- 30 day follow up for 98.3%
- Frequent coexisting illnesses
 - ~1/3 history of MI, coronary interventions, heart failure
 - ~1/2 renal insufficiency

Subgroup	Restrictive Strategy	Liberal Strategy
	no. of patients/total no. (%)	
All patients	295/1749 (16.9)	255/1755 (14.5)
Type of index myocardial infarction		
Type 1	133/730 (18.2)	101/730 (13.8)
Type 2	153/967 (15.8)	149/988 (15.1)
STEMI or NSTEMI		
STEMI	49/319 (15.4)	50/337 (14.8)
NSTEMI	246/1430 (17.2)	205/1418 (14.5)
Revascularization before randomization		
No	218/1240 (17.6)	190/1262 (15.1)
Yes	77/509 (15.1)	65/493 (13.2)
CHF, acute HF, or low LVEF		
No	115/831 (13.8)	105/802 (13.1)
Yes	180/918 (19.6)	150/953 (15.7)
Hemoglobin category		
<8 g/dl	74/404 (18.3)	73/386 (18.9)
8 to <9 g/dl	107/662 (16.2)	89/677 (13.1)
9 to <10 g/dl	114/681 (16.7)	93/686 (13.6)
Type of anemia		
Chronic	144/902 (16.0)	116/914 (12.7)
Acute	103/539 (19.1)	92/539 (17.1)
Renal function		
Renal dialysis at baseline	34/203 (16.7)	41/212 (19.3)
eGFR <30 ml/min/1.73 m ²	88/406 (21.7)	63/396 (15.9)
eGFR 30 to 59 ml/min/1.73 m ²	89/505 (17.6)	69/493 (14.0)
eGFR ≥60 ml/min/1.73 m ²	84/633 (13.3)	80/646 (12.4)
History of diabetes therapy		
No	132/801 (16.5)	117/807 (14.5)
Yes	163/948 (17.2)	138/948 (14.6)
Sex		
Male	167/975 (17.1)	133/936 (14.2)
Female	128/774 (16.5)	122/819 (14.9)
Age		
<60 yr	27/238 (11.3)	24/250 (9.6)
60–69 yr	63/421 (15.0)	54/459 (11.8)
70–79 yr	126/631 (20.0)	106/598 (17.7)
≥80 yr	79/459 (17.2)	71/447 (15.9)

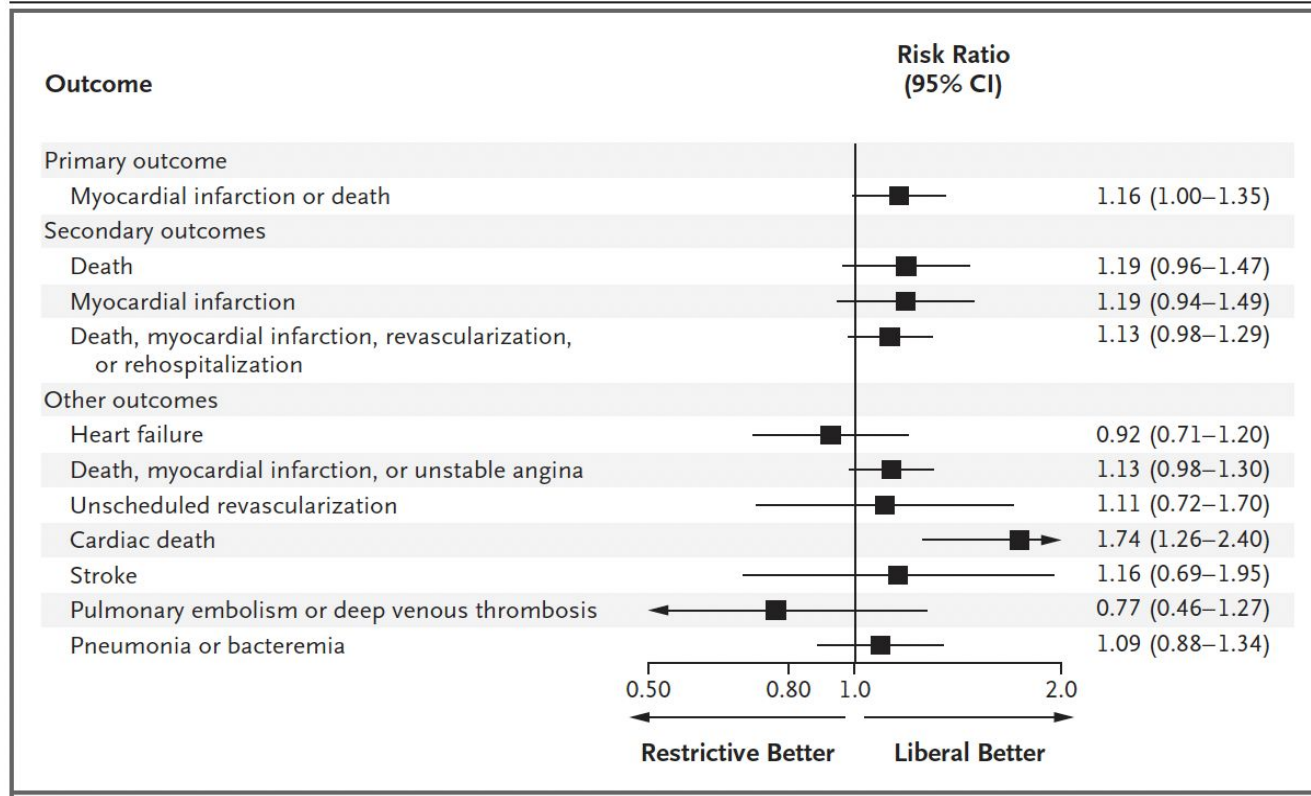
Outcome	Restrictive Strategy	Liberal Strategy
	<i>no. of patients/total no. (%)</i>	
Primary outcome		
Myocardial infarction or death	295/1749 (16.9)	255/1755 (14.5)
Secondary outcomes		
Death	173/1749 (9.9)	146/1755 (8.3)
Myocardial infarction	149/1749 (8.5)	126/1755 (7.2)
Death, myocardial infarction, revascularization, or rehospitalization	342/1749 (19.6)	305/1755 (17.4)
Other outcomes		
Heart failure	102/1749 (5.8)	111/1755 (6.3)
Death, myocardial infarction, or unstable angina	338/1749 (19.3)	300/1755 (17.1)
Unscheduled revascularization	43/1749 (2.5)	39/1755 (2.2)
Cardiac death	97/1749 (5.5)	56/1755 (3.2)
Stroke	30/1749 (1.7)	26/1755 (1.5)
Pulmonary embolism or deep venous thrombosis	26/1749 (1.5)	34/1755 (1.9)
Pneumonia or bacteremia	166/1749 (9.5)	153/1755 (8.7)

P = 0.07*

The MINT Trial **did not find a significant difference** in the incidence of myocardial infarction or death at 30 days between patients with acute myocardial infarction and anemia who were assigned to a restrictive transfusion strategy and those who were assigned to a liberal transfusion strategy

However,

- Risk ratio suggests a clinical benefit for the liberal transfusion strategy



Potential Limitations

- $P = 0.07$
 - more heterogeneity of the treatment effect than anticipated with the enrollment of a broad group of patients with acute myocardial infarction, including a large percentage of patients with demand ischemia (type 2)
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- Unblinded to health professionals caring for the patients
 - May have influenced the use of future revascularization, interventions, classification of death
- Adherence in liberal group 86.3%
 - Clinical discretion, timing of discharge



Conclusion

- No significant in group difference in incidence of death or MI through 30 days
- Difference in risk cannot be discounted
- Not crystal clear, but first trial of this size and breadth



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Thank you for
listening!