Angles, and Outcomes in Acute Ischemic Stroke

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Questions to Consider……..

DOES HEAD POSITION AFFECT MORBIDITY AND MORTALITY IN STROKE PATIENTS?

CAN HEAD POSITIONING PROTECT PENUMBRA IN THE PRE-THROMBECTOMY PATIENT?

Summary of the Discussion

- **Theme: Protect Penumbra pre thrombectomy?**

- **Head Positioning in EVT stroke Patients**
- HEADPOST → historical context
- ZODIAC → collateral perfusion

EMS implications → bridge-to-reperfusion concept

HeadPOST Trial – NEJM 2017

This study give historical prospective and establishes a basis for current recommendations.

Study Design
- **Type:** Multicenter, RCT
- **Population: 11,093 acute stroke patients** (ischemic + ICH)
- **Intervention:** Head-of-bed (HOB) 0° vs ≥ 30° for first **24 hours post-admission**
- **Primary Outcome:** Modified Rankin Scale (mRS) at 90 days

Results
- **No difference** in functional outcome (mRS 90 d): OR 0.99 (95% CI 0.89–1.10; p = 0.83)
- **No difference** in mortality or pneumonia rates
- **Adverse events:** similar between groups

Timing Caveat
- **Median onset → position: ≈ 14 hours (IQR 5–35 h)**
- Most patients positioned **well beyond the first 6 hours**, when HOB might influence collateral perfusion
- Thus, results **do not rule out benefit in hyper-acute (<6 h) LVO** cases

Take-Home Message
- For typical stroke admissions: **Flat vs Elevated = No difference** in outcomes
- **Consider timing of supine position median (14 hours) and the total time in supine position (24 hrs)**

Reference: Anderson CS et al., *NEJM* 2017; 376:2437-47

ZODIAC Trial
Head Positioning Pre-Reperfusion

Design

- Multi center randomized clinical trial
- N= 92, acute LVO with viable penumbra
- Intervention: 0° vs 30° head position pre –thrombectomy

Primary Outcome-

- **Early Neurologic Deterioration (≥2 NIHSS)**
- 0° = 1 patient vs 30° = 26 patients
- **HR 34.4, P < .001**

Secondary Safety outcomes –

- **Severe Neurologic Deterioration (≥ 4 NIHSS) -**
- 0° = 1 patient vs 30° = 20 patients
- **HR 23.6, P=.002**
- Hospital – acquired pneumonia: 0 in both groups
- **90-day mortality: 4.4% (0°) vs 21.7% (30°)**

Exploratory Outcomes -

- 90 day mRS (0-2): No Statistically significant difference

ZODIAC Trial
Interpreting ZODIAC – Signal vs Conclusion

Strong Early Signal

- Marked reduction in pre-thrombectomy neurologic deterioration
- Consistent across primary and secondary endpoints
- Interestingly, the 0° group had longer times to thrombectomy, yet still demonstrated less neurologic deterioration.

Hypothesis Generating

- Small sample size (n=92)
- Stopped early at interim analysis
- Wide confidence intervals

ZODIAC Trial

Head position: Protective Maneuver and Bridge to Reperfusion

A Protective Strategy

- Maintains neurologic stability pre-reperfusion
- Preserves collateral – dependent perfusion

Physiologic Basis

- Prior transcranial doppler (TCD) studies
- Increase residual flow velocities in LVO at 0°
- Suggests improved collateral circulation

Bridge to Reperfusion

- Minimize interim neurologic deterioration
- Supports penumbral viability until thrombectomy

ZODIAC Trial
Can this be extended to EMS?

EMS Protocol Design

- Patients with RACE ≥ 5, RACE +. "Consider supine positioning in suspected LVO patients awaiting EVT unless contraindicated"
- Documentation of Head Position

Hospital

- Maintain Supine position until Procedural Thrombectomy Positioning
- Measure results
- Continuity of records

Florida Stroke Registry

- Data collection and analysis

ZODIAC Trial
Key Takeaways

Early Signal

- Supine position **reduces** pre-thrombectomy neurologic deterioration

Clinical Implication

- Consider supine positioning in suspected LVO **pre-reperfusion**

Results

- **Early Neurologic Deterioration (≥2 NIHSS), HR 34.4, P < .001**
- **Severe Neurologic Deterioration (≥ 4 NIHSS), HR 23.6, P=.002**
- **90-day mortality: 4.4% (0°) vs 21.7% (30°)**
- **No adverse effects of supine position**

Interpretation

- Strong signal, but hypothesis generating