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Introduction:
Secondary insults (SI) occur frequently after traumatic brain injury (TBI). Their presence is associated with a worse outcome. We examined the early trajectories of hypotension (SBP<90mmHg), hypoxia (SpO2<90%) and pupillary abnormalities from the prehospital settings to the Emergency Department (ED), and their relationship with 6-months outcome.

Methods:
In this retrospective, observational study we included all TBI patients admitted to our Neuro Intensive Care Unit (NICU) from January 1997 to December 2016. We defined the trajectories of SI:
- "sustained" if present on the scene of accident and at hospital admission,
- "resolved" if present on the scene but resolved in ED,
- "new event" if absent on the scene and present in ED,
- "none" if no insults were recorded.
We investigated the association of SI trajectories with 6-months dichotomized outcome (Glasgow Outcome Scale (GOS); favorable=4-5; unfavorable=1-3).

Results:
967 patients were enrolled in the final analysis. Hypoxia and hypotension were related with unfavourable outcome when sustained (70.6% and 78.8%) and resolved (59.3% and 58.8%) while pupillary abnormalities were associated with unfavourable outcome when sustained and new events (65% and 66.7%). Results are summarized in the two figures below.

Conclusion:
Trajectories could better define the dynamic and the burden of SI and their impact on outcome of TBI patients. Early treatments can influence evolution of SI and improve outcome.

Image 1:
Figure 1. Trajectories of hypoxia, hypotension and pupillary abnormalities
Figure 2. Trajectories of SI in relation to 6-months outcome as measured by GOS.