Paramedic RSI: Incidence of Desaturation and Pulse Rate Changes

In head-injured patients, rapid sequence intubation performed by paramedics was associated with a high incidence of hypoxia.

In the San Diego RSI (rapid sequence intubation) trial, trained paramedics performed RSI in adult patients with severe closed head injuries (Glasgow Coma Scale score, ≤8). Unfortunately, data analysis showed worse outcomes in RSI patients than in controls, and the trial was stopped. Hypotension and hypoxia have been linked to poor outcomes in head-injury patients, leading the investigators to review the data for episodes of hypoxia and hemodynamic changes. The investigators limited their review to a subset of patients who had been treated by one paramedic agency that had purchased new recording oximetry-capnometry equipment during the trial.

Complete data were available for 54 of 102 patients. No significant differences were noted in demographic characteristics, mechanism of injury, Abbreviated Injury Scores, and clinical data between patients with or without complete records. An alarming 57% of patients (31 of 54) desaturated during RSI. Twenty-six (84%) of these patients had exhibited oxygen saturation levels of at least 90% before succinylcholine was administered. The median duration of desaturation was 160 seconds (range, 48-272 seconds), and the median decrease in oxygen saturation was 22%. During desaturation, pulse rate decreased by more than 20 beats per minute in 19 patients (61%) and increased by more than 20 beats per minute in 9 (29%). Eleven patients (36%) were bradycardic, and 6 (19%) were profoundly so, with pulse rates of fewer than 50 beats per minute.

Comment: These results cannot necessarily be generalized to other emergency medical services, but the finding of a strikingly high incidence of hypoxia associated with paramedic RSI in head-injury patients is alarming and dramatically different than what we see in the emergency department setting. The most likely cause is improper pre-oxygenation by the paramedics before intubation; regardless, this degree of hypoxia potentially is harmful to patients with brain injury. This study joins others that have demonstrated the downsides of prehospital intubation, a practice that clearly requires more risk/benefit analysis.

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