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IPHMI Literature Review

Keeping You Up To Date with Current EMS Literature and Studies

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- 1. The association of paramedic rapid sequence intubation and survival in out-of-hospital stroke.**
Fouche PF, Smith K, Jennings PA, Boyle M, Bernard S. Emerg Med J 2019;36:416-422.

Prehospital care providers are called upon to provide care for patients suffering from strokes on a daily basis. The care given both in the prehospital and emergent in-hospital phases of care has changed dramatically in the recent years. This study looks at the use of Rapid Sequence Intubation (RSI) by prehospital paramedics in Victoria region of Australia and compares the outcome of those patients to stroke patients that did not undergo RSI.

This study of out-of-hospital RSI administered to patients suffering from stroke was conducted by retrospective review of ten (10) years (January 1, 2008 thru December 31, 2017) of prehospital and matching in-hospital data. Victoria is a region with nearly 6.5 million residents that is serviced by a single EMS service provider using a two tiered system with only the higher tier of Mobile Intensive Care Paramedics (MICP) being able to administer paralytics. Enrollment in the study cohort was limited to patients of any age that were transported by ambulance and were admitted to a hospital with a final diagnosis of stroke. Exclusions included any cases of transient ischemic attacks, strokes that could not be classified as either hemorrhagic or ischemic or those associated with traumatic brain injury. The primary outcome examined was survival to hospital discharge.

The study cohort included over 43,000 patients identified in the study period, of which, using propensity score matching, 727 patients were compared in each of the two study groups (RSI vs no-RSI). The average age of the overall study group was 73 years old with the RSI sub-group being 65.2 years of age. The male to female ratio was comparable (51.3 vs. 48.7 respectively). Ischemic stroke accounted for the higher percentage of patients at 70.4% compared to hemorrhagic stroke at 33.1%. Overall, two percent of stroke patients (2%) underwent RSI in the field.

While only two percent (2%) of those patients that suffered strokes in Victoria during this study period received RSI, the study brings up some interesting points. The type of stroke in which RSI was used dramatically favored hemorrhagic over ischemic etiology by over 40% (74.3 vs. 31.2%).

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The age of those who were intubated using RSI were nearly eight years younger. RSI was successful in 97.3% of the patients with a first-pass success of 89.4%. Ambulance response times and transport times with relatively similar in both groups (RSI vs. No-RSI), however the on-scene time was nearly three (3) times as long (57.9 mins. vs. 21.8 mins. respectively).

After analyzing their data, the authors conclude that there is a decreased likelihood of survival for stroke patients that received pre-hospital intubation using RSI. There are a number of studies in the hospital environment that demonstrate a decreased survival for those stroke patients that undergo intubation in the hospital, but this is the first that examined its use in the pre-hospital environment.

There are a number of limitations in this study. Patients that are sicker or perceived to be sicker will receive greater intrusive interventions such as RSI both in the field and in the hospital. This study demonstrated that fact. Endotracheal intubation in the pre-hospital environment remains controversial and is the focus of many ongoing studies with no final conclusion as to its efficacy. Of note, the end-tidal CO₂ measurements deviated significantly from expected norms with 43.5% of patients in the RSI group having a “final” reading less than 35mm Hg, 1.7% having a reading less than 25mm Hg, and 3.6% having a reading greater than 45mm Hg. As is well known, derangements in EtCO₂ have a profound effect on the outcome from traumatic brain injury. The effect of these EtCO₂ values on mortality from stroke was not evaluated. One item that the authors did not call out from the data was the prolonged scene time for the RSI group. The scene time was over a half-an-hour longer (36.1 min) when the paramedics chose to utilize RSI. While it does require a longer time period to perform the RSI skill, the average transport time to the hospital was less than the increased scene time required to perform the procedure. This brings into question the underlying protocol for the use of RSI in Victoria. Specifically, would expeditious transport to definitive care rather than RSI result in an increased survival of this sub-set of patients?

Further randomized trials are needed to determine if RSI is of benefit or detriment in patients suffering from stroke.

2. Who Long-term outcomes among injured older adults transported by emergency medical services. Newgard CD, Lin A, Yanez ND ,et al. Injury, Int. J. Care Injured. 2019;50:1175-1185.

Hemorrhage Each day thousands of older adults are involved in traumatic events requiring care and admission to hospitals nationwide. The entry into the trauma system typically follows the standard prehospital trauma triage format when transport by EMS is necessary. Little is known however about the long-term mortality of these older adults after treatment and transport by EMS systems and management by the trauma system.

The authors conducted a retrospective population based cohort study evaluating twelve (12) month mortality of older adults (greater than 65 years of age) after a traumatic event who were transported by an EMS agency. The study was conducted in the Pacific North West utilizing 44 EMS agencies and 51 hospitals for the calendar year ending December 31, 2011 with follow up of enrolled patients for one year through December 31, 2012. The seven counties selected for inclusion in the cohort included Metropolitan, Urban, Suburban and Rural. The primary outcome was time-to-death measured from time of initial injury to outcome during the next 365 days.

During the study period, 20,808 calls for service for adults over the age of 65 by the EMS agencies with a primary complaint of injury or trauma were recorded. Of these 15,649 were transported to a hospital by EMS and entered into the EMS cohort for this study. Women accounted for 68% of patients, two thirds of all patients had comorbidities, and the average age was 82 years. The primary cause of injury was from falls (84.5%). Mortality rates were 1.6% during their hospitalization, 5.1% at 30 days, 9.6% at 90 days and 20.3% at one year. The most common causes of death were cardiovascular incidents and dementia. This one year mark of 20.3% compares to only 7.2% of all trauma age groups in the State Trauma Registry. There were very few deaths in the field

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with only 21 (0.1%) in the older adult cohort. Over 56% of the patients were initially seen at a non-trauma hospital with only slightly over 12 % being initially cared for at a level I or II trauma center.

An older adult patient who is transported by EMS after a traumatic event has over a 20% chance of mortality within one year of the incident. While the study does not investigate what could be done to decrease mortality numbers, certainly there are some common-sense factors that can be implemented. First since the highest incidence of trauma in this group came from falls, fall prevention programs should be implemented in the community much similar to other trauma prevention programs currently in place. The study pointed out that the majority of the patients in the study were initially transported to non-trauma hospitals and evaluation of the destination protocol for older adults may need to be revised, much as pediatric trauma triage has been. However, some studies have suggested that older adults with orthopedic injuries, specifically hip fractures actually have better outcomes at non-trauma centers. Further evaluation of EMS trauma triage criteria and destination for older patients, combined with a multi-faceted approach in the initial hospital care of these patients, needs to be considered.

3. Adherence to “No Transfer to Hospital” Advance Directives Among Nursing Home Residents.

Nemiroff L, Marshall EG, Jensen JL, Clarke B, Andrew, MK. J Amer Med Directors Assoc 2019;20:1373-1381.

As the population ages, more older adults are admitted to long term care (LTC) facilities, many with advanced directives (AD) designed to guide their care. This study investigates the adherence by nursing homes to a “no transfer to hospital” advanced directive and patient transfers to the hospital by paramedics.

The study was a retrospective review of 748 patients (71.9% women) with a mean age of 83 years in ten (10) nursing homes located in Nova Scotia Canada from three separate time periods starting in September 2008 and ending in February 2012. . Of the cohort, 691 (92.4%) had documented ADs. Excluded patients did not have ADs in place at the time of the study. Of those included in the study, 67.8% had dementia and 88.5% were deemed moderately to severely frail.

Paramedics were called for 556 (80.5%) of these patients; of this group 409 were transferred to a hospital. Of 356 patients with ADs specifying “do not transfer to hospital”, EMS was called for 284 (79.8%) and, of these patients, 210 (73.9%) were transported to the hospital. This represents 51.3% non-compliance with AD directives. The majority of those transferred to the hospital were due to trauma rather than medical issues. Falls accounted for the greatest percentage of these whereas patients transferred for medical conditions were predominantly respiratory in origin followed by infection delirium and fever.

In the group of patient transferred to the hospital against their AD, 24.8% were done on a physician order. Patient and or family request for transfer amounted to only 6.6% with nursing staff at the facility requesting the remainder of the transfers. Of the patients transferred against their Ads, approximately 50% were reported as “better” on their return to the nursing facility whereas 36% were reported as unchanged, worse or died after transfer.

This study calls into question the effectiveness of and adherence to advanced directives, especially as they deal with patients sustaining trauma. Paramedics can be faced with an ethical dilemma when presented with a request for hospital transport with a patient that has a “No Transport” AD in place. Better defined ADs that list exceptions to the “no transfer” directives, such as transfer in cases of acute trauma or for specialized imaging and testing, need to be built into the directives. Discussion with the patient and their family regarding the potential for hospital transfer should take place at the time of initiation of the AD prior to an incident.

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4. EMS Can Safely Transport Intoxicated Patients to a Sobering Center as an Alternate

Destination. Smith-Bernardin SM, Kennel M, Yeh C. Ann Emerg Med 2019;74:112-118.

Emergency Medical Services (EMS) responses to intoxicated individuals are a common occurrence for EMS units across the USA. Currently in most instances, these patients are evaluated by EMS and either turned over to law enforcement or, more commonly, transported to nearby Emergency Departments for further evaluation and treatment as necessary, and in most cases monitoring until sober up and ultimately discharged. It is an all too common sight on a weekend night to have a significant percentage of the E.D. beds occupied by patients with acute alcohol intoxication. While a percentage of these patients need acute medical care that only an emergency department can provide, many only need monitoring and rehydration until the alcohol is metabolized.

Some large cities have introduced Sobering Centers for suspected uncomplicated acute alcohol intoxication as an alternative to Emergency Department admission. Unfortunately, in many jurisdictions EMS personnel are prohibited from transporting patients to these centers directly. The authors of this study evaluated those patients brought into the Sobering Center by EMS, referred from an emergency department, or transferred from the sobering center to an emergency department for an acute condition that is outside the scope of the sobering center.

The sobering center in this study is located in San Francisco and has been actively been accepting patients since 2003. The 12 bed center is staffed by RN's and Medical Assistants and provides oral rehydration, vital sign monitoring, minor wound care, meals and support for activities of daily living. EMS units acting under approved triage protocols are allowed to transport patients to this alternative destination directly.

During the three year study period from July 2013 to June 2016, 11,596 visits (3,268 unique patients) were treated at the center. Thirty-five (35%) of these patients were transported to the sobering centers directly from the point of EMS contact. The majority of patients were managed at the sobering center without complication. Of the 506 patients that were secondarily transported from the sobering center to an emergency department, 151 were initially referred to the center by EMS. Criteria for transfer included; abnormal vital signs, active vomiting, pain not associated with chest pain, and altered mental status. A high percentage of the patients transferred had more than one of these indicators. There was one fatality during the study period involving a patient that was referred by EMS; however this was determined to be from subsequent cocaine intake after admission to the center.

This study had a number of limitations. Admission to the sobering center was based on clinical suspicion of acute alcohol intoxication without confirmation such as breathalyzer analysis. No final disposition data was obtained from the hospitals after transfer from the sobering center. EMS admission protocols and sobering center secondary transfer protocols do not exactly match. Finally, there was no evaluation or data provided regarding patients transported by EMS for alcohol intoxication to the emergency department instead of the sobering center.

With many cities struggling to deal with acutely intoxicated patients, sobering centers are an alternative to admission into a traditional emergency department, thus allowing for better utilization of the available emergency beds. This study shows that patients can be safely triaged by EMS personnel working under approved medical protocols to sobering centers. Further studies that compare the final outcome of intoxicated patients contacted by EMS that are transported to the sobering center versus the emergency department are warranted. This could help to further refine the field triage scheme to better direct patients to the most appropriate care site.