Incidence of, risk factors for, and mortality associated with severe acute kidney injury after gunshot wound

Authors: Athavale AM et al.

Summary/comment: This retrospective trauma registry review conducted over a 5-year period, examined the association between civilian gunshot wounds (GSW) and acute kidney injury (AKI). AKI may result from direct injury to the urinary tract or acute tubular necrosis from associated complications such as hypotension, rhabdomyolysis or sepsis. Patients most at risk of gunshot wounds were male and of African or Hispanic backgrounds. The incidence of overall severe AKI (SAKI) was low (2.3%) and less in those needing dialysis (0.9%). Those most likely to suffer SAKI were older and more likely to have comorbidities of diabetes, hypertension and concurrent complications such as reduced coma score, sepsis, hollow vисcous injury and higher injury severity scores. Mortality was higher in older patients, those requiring dialysis (AKI-D) and those with a more significant injury. After adjustment for all variables other than extent of kidney injury, those patients with kidney injury following GSW were twice as likely to die than those that did not.

The authors have used a number of definitions to identify patient with AKI, SAKI and AKI-D, excluding those with known pre-existing kidney disease. Appropriate univariate and multivariate statistics were applied to determine significance of independent relationships. For example, to identify the excess risk of mortality in patients with GSW who developed SAKI, patients were matched by age, sex, systolic blood pressure, GCS, sepsis, hypertension, diabetes, urinary tract injury, hollow viscous injury, and injury severity scores. The authors note that outcomes were based on retrospective data with its accompanying limitations in data integrity and definitions. However, the number of patients included in subgroup analysis were reasonable and the results valid. This study is a well-constructed epidemiological report of kidney injury and outcomes in this cohort of patients.

Reference: JAMA Netw Open. 2019;2(12):e1917254

Abstract

Independent commentary by Professor George Braitberg

Professor Braitberg has been a practicing emergency physician and toxicologist for 30 years. He is the Professor of Emergency Medicine, Department of Medicine Royal Melbourne Hospital and Head of Emergency for the Centre for Critical Care Medicine at the University of Melbourne. He is Executive Director of Strategy, Quality and Improvement at Melbourne Health. Professor Braitberg is a Fellow of the American College of Medical Toxicology, the Australasian College for Emergency Medicine and the Royal Australasian College of Medical Administrators. He holds Masters in Bioethics and Health Services Management. He is a member of the Victorian Clinical Council, a board member of St John’s Ambulance (Victoria) and medical advisor to Ambulance Victoria. His research interests include toxicology, pre-hospital care, clinical governance and health system redesign and the management of acute behavioural emergencies. He has published over 60 peer reviewed papers and authored 20 book chapters.
Association of patient and visit characteristics with rate and timing of urologic procedures for patients discharged from the emergency department with renal colic

Authors: Schoenfeld EM et al.

Summary/Comment: Patients presenting with renal colic to the ED are common, and as the authors contend, little is known about the timing of urologic interventions in patients with renal colic discharged from the ED. The aim of this study was to examine the rate and timing of urologic procedures performed after an ED visit. This study was a single site, retrospective, large population cohort study of adult patients in the United States whose subsequent care was identified over a 2-year period to determine what follow up occurred. A total of 66,218 unique index visits by 55,314 patients were documented. 8.8% had visits resulting in admission at the index encounter, of which 2.7% had visits resulting in a urologic procedure during that admission, 5.0% led to a urologic procedure within 7 days, 7.3% within 14 days, 9.8% within 28 days and 12.7% within 60 days. 5.3% of patients represented to the ED within 7 days and 11.3% within 60 days. Having Medicaid-only insurance was associated with lower rates of urologic procedures (OR 0.70; 95% CI, 0.66, 0.74) and urologic follow-up (5.6% vs 8.8%; P < 0.001) and higher rates of primary care follow-up (59.2% vs 47.2%; P < 0.001) compared with patients with all other insurance types. This study highlights that over a third of patients required a urological procedure following ED presentation for renal colic. Lesser rates of follow up, lower rates of intervention and greater delay to interventions were seen among those without private health insurance. Higher risk of intervention was associated with increasing age, need for antiemetics and non-steroidal medication. Imaging was associated with lower rates of surgical intervention. In general, CT scanning at the initial ED visit did not change rates of surgical intervention. The authors contend that “with patient input, practitioners could then establish a plan for delayed CT, as needed, based on the patient’s symptoms. A pathway that delays CT has the potential to decrease the radiation burden for this at-risk population”. This study outlines the clinical outcomes of a large cohort. The observation that the vast majority of patients have not required surgical intervention at 60 months (>80%) and that early CT scanning does not change rates of surgical intervention, suggests that CT scanning is overused and unnecessary in most cases unless there are complications. In those patients under the age of 65 the authors suggest a delayed CT approach. Changes in practice depending on insurance status are concerning.

Reference: JAMA Netw Open. 2019;2(12):e1916454
Abstract

Initial and sustained response effects of 3 vagal maneuvers in supraventricular tachycardia: a randomized, clinical trial

Authors: Ceylan E et al.

Summary/Comment: This prospective, randomised, single site, ED-based study was aimed at analysing the success rates of 3 vagal manoeuvres as measured by sustaining sinus rhythm at the fifth minute and supraventricular tachycardia (SVT) termination in adult patients. Groups were randomly assigned to receiving the standard Valsalva manoeuvre (sVM), the modified Valsalva manoeuvre (mVM) and carotid sinus massage (CSM) as first line interventions in patients presenting with SVT. The mVM method involves moving the patient from a supine positioning with leg elevation immediately after the Valsalva strain. The sample size to ascertain effect size for the primary hypothesis was determined by interim analysis. Ninety-eight patients were enrolled of which a quarter were initially reverted with vagal manoeuvres with only 12.2% sustained at 5 minutes. The most successful manoeuvre (constituting almost half of the initial successful group) was mVM. The initial success rate of mVM (43%) matches that published previously by Appelbourn and colleagues. Patients who responded to mVM also were more likely to stay in sinus rhythm compared to the other modalities. This study is simple and informative. mVM seems to be superior, but clinicians should be aware that of this most successful manoeuvre only 12/32 patients remained in sinus rhythm at 5 minutes. The study was not large enough to provide any further information that might predict who would benefit most from vagal manoeuvres, however if the simple addition of raising a leg significantly increases my patient’s chance of staying in sinus rhythm with no adverse outcomes the manoeuvre seems worth trying.

Abstract

Assessment of unintentional duplicate orders by emergency department clinicians before and after implementation of a visual aid in the electronic health record ordering system

Authors: Horng S et al.

Summary/Comment: Electronic medical records are being widely implemented in medical practice. There are a number of products and vendors and much of the literature focuses on the risk benefit ratio of using an electronic record or the interruptive nature of “hard stops” or post order alerts. In this article the authors highlight the risk of duplicate order implementation and discuss whether a simple visual aid may reduce the incidence of order duplication. This cohort study of nearly 200,000 ED visits to an academic centre evaluates the impact of the intervention 1 year before and after its implementation. As the implementation of each order modality (radiology, pathology and medication) occurred at a different time the study was performed by an interrupted time series method. The visual aid cued the physician by placing a red highlight around the checkbox of the order. Duplicates were identified if 1 of 2 identical orders were cancelled by the physician during the same ED visit. Analysis was done at a shift level to account for environmental variables. Unintentional orders reduced after the introduction of the visual cue in all order sets other than medication, with laboratory orders reducing the most (IRR 0.51). Interestingly in this study patients with lower acuity had more radiology duplicate orders after the intervention. The authors don’t account for this. Increased activity levels in the ED including more patients in the waiting room, more new patients per shift and number of inpatient admissions did not show a consistent pattern of effect following the intervention. The lack of a consistent outcome suggests that the intervention may still lead to response fatigue. As there was no change in medication order duplicates and no obvious environmental association, I am not sure if one can say the intervention was a success and hence I do not support the authors’ conclusion.

Reference: JAMA Netw Open. 2019;2(12):e1916499
Abstract
Efficacy and outcomes of lipid resuscitation on organophosphate poisoning patients: a systematic review and meta-analysis

Authors: Yu S et al.

Summary/Comment: Organophosphate (OP) poisoning is still a leading cause of death among accidental or suicidal poisonings worldwide with China reporting the majority of cases. In recent years, lipid emulsion therapy has been actively applied to OP poisoning cases in China. This paper reviews 7 RCTs (n = 630) in whom lipid emulsion was used in the treatment of OP poisoning. The largest study that contributed to this meta-analysis was the Journal of Heze Medical College which included 247 patients; the type of OP was not reported (Wang Liwen et al. 2012). In the 4 studies that included cure rates, lipid resuscitation compared favourably (OR 2.54) and in the 4 studies that examined mortality, lipid resuscitation led to less death (OR 0.31). Acetylcholinesterase levels were measured in 2 studies and both showed higher levels in the lipid emulsion group.

I had several concerns with this paper. There was no controlling for severity of disease, demographics (other than age and gender), standard of routine care, type of OP and timing or dose of lipid therapy. While identified as randomised, only 5 studies reported the method of randomisation and none of the studies reported the details of allocation concealment. The authors note that all studies were carried out in a single country and the methodological quality of the papers was deemed to be “low”. As the authors state, “larger multicentre RCTs are still recommended.” I will not introduce lipid emulsion to my practice of the management of OP poisoning based on this meta-analysis and I am surprised that it was published given the limitations noted.


Intranasal ketamine reduces pain of digital nerve block: a double blind randomized clinical trial

Authors: Nejati A et al.

Summary/Comment: This double blind, randomised, single centre clinical trial encompassed 100 adult patients who required a digital nerve block (DNB). Participants were randomly allocated (via computer generated random sequence blocks of 4) on a convenience sampling basis to receive intranasal (IN) ketamine (50 mg in 1mL) or placebo (1mL normal saline) 5 minutes before DNB. In both groups, patients’ pain score was recorded by visual analogue scale (VAS) at baseline, after DNB and 45 minutes after completion of the DNB. The primary outcome was reduction in pain intensity, while the secondary outcomes included the occurrence of adverse effects and complications within 1 hour of completion of the procedure. A power calculation looking at an effect size of at least 16 on the VAS required 49 patients in each group.

The study showed that administration of intranasal ketamine in patients who underwent a painful procedure resulted in a significant reduction in procedural pain as well as pain experienced 45 minutes after the block, with no statistical difference in physical parameters between groups. The authors describe few adverse events with ketamine and none that were significantly different between the 2 groups. This is a good study and one which would encourage emergency physicians to consider the use of intranasal ketamine in their practice.


Comparison of the analgesic effects of haloperidol with or without morphine in patients with acute renal colic: a randomized double-blind clinical trial study

Authors: Masoumi K et al.

Summary/Comment: This is an interesting study as it highlights different approaches to management of conditions in different parts of the world. Haloperidol, a dopamine antagonist, has been used for the treatment of psychosis and behavioural disturbance in EDs for many years. In this study from Iran they have looked at the use of haloperidol as an adjunct to morphine in the treatment of renal colic. This randomised, double-blind trial divided adult patients into 2 groups, 1 receiving IV morphine and haloperidol and the other receiving morphine alone. The authors argue that a major aim in renal colic treatment is to reduce the prescribing of repeated doses of analgesia to reduce side effects. Patients who experienced renal colic for the first time required imaging to confirm the diagnosis, either by CT or ultrasound. A 10-point visual pain analogue scale (VPAS) was used to determine level of pain. Patients with an initial pain score >3 were randomised through block randomisation. All patients were given an infusion of 5 mg of morphine and either 5 mg of haloperidol or normal saline. A VPAS score was determined at 0, 20, 40 and 60 minutes, with physical parameters documentation of side effects. A significant response was noted to be a change of 2 or more. Fentanyl (1 μg/kg) was used as a rescue agent if pain persisted or increased. Each group enrolled 70 patients; a sample size estimate for significance was not provided. There was no statistical difference between the two groups in pain severity after treatment or in side effects. The frequency of extrapyramidal symptoms reached 4.3% but was not statistically significant.

The results of this single site study are limited by lack of a sample size calculation. Without understanding why the authors randomised 70 patients into each group it is difficult to draw any conclusions. It is likely that haloperidol did not have any effect in alleviating pain, but I wonder whether the reason why the side effects were not shown to be significantly different may well be due to the small sample size.


Contact

Research Review

Email geoff@researchreview.com.au
Phone 1300 132 322

Keeping up to date is easy with Research Review

Delivered free to your inbox — 10 studies per month, 15 minute read — the Australian perspective, on the world’s most prestigious journals.

SUBSCRIBE free, click here to visit www.researchreview.com.au and update your subscription to Research Review.
Comparison of phenobarbital-adjunct versus benzodiazepine-only approach for alcohol withdrawal syndrome in the ED

Authors: Sullivan SM et al.

Summary/Comment: There are approximately 5 million ED visits annually in the United States due to alcohol consumption and for those in alcohol withdrawal. The mainstay of treatment has been a benzodiazepine-based alcohol withdrawal treatment regimen linked to an appropriate alcohol withdrawal scale. This retrospective cohort study conducted in 2 academic EDs in the United States compared a phenobarbital-adjunct versus benzodiazepine-only approach for the management of alcohol withdrawal syndrome in the ED. At the time of the trial there was no alcohol withdrawal treatment regimen and patients were treated based upon provider preference. Hence the authors looked back over a 4-year period and divided patients with a presenting diagnosis of alcohol withdrawal syndrome based on whether they received adjunctive phenobarbitone or not. Data was extracted by 2 investigators while a third conducted a random audit of 10% of the sample for integrity checking and determined there were no systematic errors. A fourth examiner audited the data to ensure there were no discrepancies or missing data. The sample size calculation was based on the effect size from a previous investigation by Robensen, Clements and Simon et al., estimating the need for 2 groups of 74 patients to ensure statistical significance of the study’s main objective. There were 209 patients included in this study (phenobarbital, n = 97 and non-phenobarbital, n = 112). The primary outcome was the need for ICU admission, while secondary outcomes included Clinical Institute Withdrawal Assessment for Alcohol (CIWA-Ar) scores at ED discharge, and complication rates. Complications were defined as a composite of death, need for intubation, hypotension or vasopressor use, seizures, or hospital acquired pneumonia. Patients were categorized into 2 groups; Group 1 received phenobarbital in the ED (with or without benzodiazepines), and Group 2 received non-phenobarbital-based therapy. Most patients were male (85%) with a mean age of 49 years. Patients who received phenobarbital were more likely to have a history of alcohol withdrawal seizures and had a higher total bilirubin. A similar proportion of patients in the phenobarbital (14%, n = 14) and non-phenobarbital (11%, n = 12) groups required ICU admission (p = 0.529). The occurrence of complications was also similar in the phenobarbital (9%, n = 9) and non-phenobarbital groups (11%, n = 10). However, the phenobarbital group had a statistically shorter overall hospital length of stay. The 2 major limitations of the study included those applicable to any retrospective study and that there was no control of medication doses. The authors’ conclusion remains valid, i.e. adjunctive phenobarbitone use in the ED for alcohol withdrawal syndrome did not result in decreased ICU admission, severity of symptoms, or complications.


Abstract

Description and cost-analysis of emergency department attendances for hand and wrist injuries

Authors: Robinson LS & O’Brien L

Summary/Comment: This Australian cost analysis study was performed with the aim of estimating the economic cost of ED attendances for hand and wrist injuries. It is estimated that these injuries account for 10% and 30% of all ED presentations. The study looked at attendances to 2 metropolitan EDs over a 2-year period (2015-2016) of patients whose primary presentation was coded as a hand or wrist injury. The study aimed to estimate the direct ED costs and describe the demographic profile of the patient cohort. Direct costs included services associated with allied health, ED medical, imaging, pathology and pharmacy as well as indirect medical costs e.g. overhead costs such as electricity and laundry services. A total of 10,024 records were identified representing 5.4% of overall ED attendances (less than previously reported). Patients were predominantly male (62%), with a mean age of 36.4 years. The most likely cause of injury was a laceration, followed by falls, sports-related, crush or direct blow injuries. The commonest mechanism of injury was an open wound followed by a fracture of the wrist and hand. Weekend presentations were more likely. The total cost of ED-related direct and indirect medical costs in the 2-year study period was $3,959,535 ($1,923,852 in 2014–2015 and $2,035,683 in 2015–2016). The mean cost per presentation was $393 and $407 respectively. Fractures accounted for the largest proportion of ED direct costs, with a mean cost of $489 in 2015 and $558 in 2016. The authors note that ED staffing should match ED presentations and staffing EDs with weekend physiotherapists and hand therapists would be beneficial. They also noted that power tools accounted for a large number of the lacerations. The major limitation to this study is that it cannot tell us the overall cost to the health system. This information would be useful to allow us to put the ED costs into perspective. Is it more economical to perform fracture, dislocation and laceration repair and reduction in the ED and how do these resource intense procedures impact on the ED patient flow? How do these costs compare with activity-based funding incentives for inpatient procedures? As a “stand alone” economic evaluation I found the data interesting but not surprising.


Abstract

Extended-release quetiapine overdose is associated with delayed onset of toxicity compared to immediate-release quetiapine overdose

Authors: Taylor L & Graudins A

Summary/Comment: There are an increasing number of controlled and sustained release pharmaceuticals available on the market. Nearly 500 years ago, Paracelsus, the Swiss physician and chemist said that “all things are poison, and nothing is without poison, the dosage alone makes it so a thing is not a poison”. Hence it is important to not only understand the pharmacokinetics but also the toxicokinetics when these substances are taken in overdose. This is a retrospective chart review of 286 patients referred to a single toxicology unit over a 3-year period following an overdose of quetiapine. The aim of the study was to understand the clinical course of toxicity following quetiapine extended-release (XR) poisoning. Inclusion criteria included age 13 years and over with quetiapine overdose (defined as more than 400 mg) alone or in combination with other substances. This cohort represented 9% of all toxicology referrals, with 113 being immediate-release (IR) and 55 being XR; 67% were female. The majority (86%) were due to deliberate self-poisoning. The median reported dose of quetiapine XR ingested was significantly larger than for quetiapine IR (4000 vs 1500 mg), however the median time taken to reach the lowest recorded GCS was longer for XR overdose presentations (5.0 vs 4.4 hours). Patients with XR ingestions were almost 3 times more likely to be admitted to the ICU. Median time to recovery from sedation for XR was 20 hours (IQR 12–39) compared to 12 for the IR preparation. Unfortunately, this study was limited by lack of corroborating serum concentrations to help correlate toxicokinetics to clinical effects. However, based upon clinical effects the absence of sedation or tachycardia 12 hours post-overdose of quetiapine XR seems a reasonable timeframe to rule out significant poisoning.


Abstract

Australian Research Review subscribers can claim CPD/CME points for time spent reading our reviews from a wide range of local medical and nursing colleges. Find out more on our CPD page.