



The Australasian Society for Motorsports Medicine and Rescue

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Race control

Another month and there's been some great motorsports. There is a wealth of events this weekend alone with the V8s in Hamilton, the WRC in Turkey, F1 in Shanghai and the Red Bull Air Race in Perth. There have been some spectacular crashes as well – Sebastian Buemi's front wheels parted company with the rest of the car in testing at Shanghai, leaving him with no way of steering and relying on the crash barrier and gravel trap to stop him. Also during testing, Adilson Kindlemann's plane skimmed and then crashed into the Swan River in Perth. During day 1 of racing in Turkey, one of the drivers got a bit enthusiastic at a jump, took huge air and snapped off his front left wheel. It's a good job there are willing volunteers on standby to scrape them up, patch them back together and send them off racing again.

Given the carnage, this month's review looks at an article that tested intranasal fentanyl in the pre-hospital setting. While not truly representative of our patient group and flawed in many ways, it is the first to try and justify a fairly simple route for a good analgesic in the pre-hospital population.

There is a review of some notable motorsporting occasions around the world and the usual update of results for some of the bigger professional series

Good luck.

Matthew Mac Partlin

Clinical review

Intranasal Fentanyl analgesia

The provision of adequate analgesia is a frequent requirement at motorsports events. The majority of pain that presents for management can be controlled with simple agents such as acetaminophen (paracetamol) and NSAIDs. However, some occasions require more significant analgesics, be it a trapped competitor or pit staff with injuries. The commonly used agents are opiates, such as IV morphine or fentanyl, and ketamine. There are, however, potential problems with these drugs.

The opiates have well documented adverse effects such as respiratory depression, impairment of airway protective reflexes, nausea and vomiting. They can also be problematic in that IV access is the preferred route of administration. This may be difficult to obtain for a dehydrated, agitated driver who is being cut out of a vehicle. Intravenous morphine is sometimes associated with a local histaminergic reaction, more so than fentanyl.

Ketamine is a general anaesthetic agent with analgesic and amnestic properties. It can be administered by both the intravenous and intramuscular routes. It is rapidly effective, within minutes, and has an effective half life of 15 – 20 minutes (redistribution to tissues, with subsequent liver metabolism and renal clearance). One of its advantages over the opiates is the preservation of airways reflexes. These properties make it a very effective field analgesic and it is carried by retrieval agencies. However, it too has its problems.

Although it preserves airway reflexes, it is associated with increased salivation, which can irritate the vocal cords and precipitate laryngospasm. It can also produce bradycardia, tachycardia, hypo and hypertension. The dissociative state that it induces can lead to an unpleasant emergence phenomenon and, later on, disturbing flashbacks. Some practitioners use a benzodiazepine to mitigate these effects.

Methoxyflurane, a fluorinated anaesthetic agent, is provided as a 3ml inhaler device and is commonly employed by ambulance services for managing severe pain, especially trauma related, in adults. Its inhaled route means ease of administration and it has rapid onset and offset of effect. Again, it has its own problems. It can cause dysphoria and confusion, respiratory depression, nausea and vomiting. Uncommonly, it can precipitate renal failure, malignant hyperthermia and hepatitis.

In the last few years, there has been increasing experience with intranasal fentanyl, drawn up into a syringe and sprayed through an atomiser attachment. Predominantly studied in paediatric populations, in the post-operative and emergency department environments, there is evidence to suggest that it is at least as effective as IV opiate administration (1) and may avoid some of the opiate adverse effects. It has also been associated with reduced time to administration in a difficult population (2,3). More recently, its use in adult populations has been examined in several trials for the postoperative and burns dressing settings. A trial assessing IN fentanyl in the pro-hospital arena was published in 2006 (4). Though the trial failed to reach the estimated required sample size and was open-label, it suggested that in an adult pre-hospital population, 180 µcg of intranasal fentanyl with up to 2 subsequent doses of 60 µcg at 5-minute or more intervals was at least as effective as IV morphine 2.5 to 5 mg with up to 2 further doses of 2.5 to 5 mg at 5-minute or more intervals, as assessed by a patient rated scale.

Patients were 18 – 65 years old and had pain rated >5/10 on initial assessment. Notable exclusions were an SpO₂ <85%, systolic BP <110mmHg, heart rate greater than 150bpm or less than 50bpm or

altered level of consciousness, all of which are likely in a motorsport population. About a third of the pain sources treated were long bone fractures or dislocations. The remaining sources were given as abdominal, chest, back or other. What proportion was contributed by cardiac pain was not stated.

Interestingly, the majority of adverse events, including respiratory depression, hypoxia and hypotension actually occurred in the IN fentanyl group. While greater than the IV morphine adverse event rate, it did not reach significance, though this may have been masked by the inadequate sample size. The open-label nature of the trial may also have affected reporting. This apparent trend is at odds with most other trials of IN fentanyl, which typically report low rates of adverse events; though the sample populations may have inherent differences (eg. pre-hospital versus post-operative).

The use of rescue analgesia for patients whose pain was not adequately settled by the third study drug dose were not significantly different. However, 2.5 to 5mg boluses of IV morphine are not particularly large doses and may have been inadequate. The optimum IN fentanyl dose for adults has not yet been clarified, though most trials generally use 1.5µcg/kg boluses (5). Children, for whom the majority of evidence exists, in Australia are typically treated with 1.5µcg/kg, drawn from either a 50µcg/ml or 300µcg/ml vial, depending upon the resulting volume required.

So, it seems reasonable to add intranasal fentanyl 1.5µcg/kg, to a maximum bolus of 180µcg, to the armamentarium of analgesics that can be rapidly administered to injured competitors and support staff, while remaining aware of its potential adverse effects and limitations and the paucity of evidence to determine whether or not it might be better than already existing medications. It might be worthy of a clinical trial amongst the motorsport medical and rescue provider fraternity, should anyone wish to take up the challenge, or better yet, co-ordinate a study between several rescue agencies.

References

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Recent race results

Formula 1

Well done Felipe Massa! After an injury that many thought would end his career less than a year ago, there he is at the top of the driver standings. It's also good to see the top 7 placed drivers all within 10 points of each other. And Vettel finally gets the top podium position that he has deserved since the start of the season.

1. Felipe Massa - Ferrari 39 2. Fernando Alonso - Ferrari 37 3. Sebastian Vettel - Red Bull-Renault 37 4. Nico Rosberg - Mercedes 35 5. Jenson Button - McLaren-Mercedes 35 6. Lewis Hamilton – McLaren-Mercedes 31	7. Robert Kubica - Renault 30 8. Mark Webber - Red Bull-Renault 24 9. Adrian Sutil - Force India-Mercedes 10 10. Michael Schumacher - Mercedes 9 11. Vitantonio Liuzzi - Force India-Mercedes 8	12. Rubens Barrichello – Williams-Cosworth 5 13. Jaime Alguersuari - Toro Rosso-Ferrari 2 14. Nico Hulkenberg - Williams-Cosworth 1
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Next race: Shanghai, China, 14th - 18th April

World Rally Championship

Jordan has hosted the most recent WRC stage. Lavalala led most of the first days stages, but was eventually reeled in by Loeb who powered through to the end; though Latvala stayed in touch. However, only a 50 second penalty after dodgy team tactics kept Ogier from claiming second place. A good performance from an increasingly consistent Yari-Matti. Mikko Hirvonen failed to finish for the first time since 2007, crashing out on Saturday after launching the rear end of his car off a crest. Kimi Raikonen, formerly of F1 fame, lies just outside the top 10 overall.

1. Sebastien Loeb 68 2. Jari-Matti Latvala 43 3. Mikko Hirvonen 37 4. Petter Solberg 35	5. Sebastien Ogier 33 6. Dani Sordo 24 7. Henning Solberg 18 8. Matthew Wilson 16	9. Federico Villagra 12 10. Mads Ostberg 4 11. Kimi Raikonen 4 12. Martin Prokop 2
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Next event: Turkey, 14th - 18th April

V8 Supercars

No new results for the V8s, as the round at Albert Park does not contribute points. They are racing this weekend for points.

1. Jamie Whincup 771 2. Mark Winterbottom 714 3. James Courtney 696 4. Shane van Gisbergen 630	5. Lee Holdsworth 573 6. Craig Lowndes 552 7. Rick Kelly 530 8. Paul Dumbrell 489	9. Michael Caruso 462 10. Steven Johnson 455 11. Garth Tander 447 12. Will Davison 402
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Next round: Hamilton 400, 14th - 18th April

MotoGP

The season has kicked off in Qatar with a win for Rossi. Casey Stoner had bike troubles that took him out of the race, easing pressure on Rossi.

1 Valentino ROSSI 25 2 Jorge LORENZO 20 3 Andrea DOVIZIOSO 16 4 Nicky HAYDEN 13	5 Ben SPIES 11 6 Randy DE PUNIET 10 7 Dani PEDROSA 9 8 Colin EDWARDS 8	9 Loris CAPIROSSI 7 10 Hiroshi AOYAMA 6 11 Marco SIMONCELLI 5 12 Hector BARBERA 4
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Next round: Motegi, Japan, 25th April

Intercontinental Rally Challenge

Three events completed: Monte Carlo, Curitiba (Brazil) and Argentina. Of the twelve competitive rounds, points from the best 7 performances determine the overall score.

1. Juho Hänninen 24 2. Guy Wilks 19 3. Jan Kopecky 15 4. Mikko Hirvonen 10	5. Kris Meeke 10 6. Bruno Magalhães 9 7. Nicolas Vouilloz 6 8. Gabriel Pozzo 5	9. Stéphane Sarrazin 5 10. Federico Villagra 4 11. Eduardo Sheer 3 12. Daniel Oliveira 2
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Next event: Canary Islands, 29th April - 1st May



Worldwide motorsport update

FIA institute

The FIA has announced the dates for its next Medicine in Motorsport Summit as the 17th to 19th of September, to be held in Valencia, Spain. This will be the third summit, following last year's event at the Bahrain International Circuit Centre of Excellence. It is timed to coincide with rounds of the World Touring Car Championship and Formula 2 taking place nearby. The programme has not yet been released.

- Source: FIA Institute for Motorsport Safety and Sustainability, 14th April 2010.

Manufacturers

Ralliart, the rallying branch of the Mitsubishi Motor Corporation, has announced its closure. All operations have ceased and all staff made redundant. Worldwide distributors, being independently owned, continue to operate, but will receive no further products from Ralliart. As such, parts for Ralliart models will no longer be manufactured and sourcing replacements is likely to become

increasingly difficult. So expect to see Mitsubishi race car owners ditch their cars, stop racing or putting them under covers until natural attrition leaves them with a “last-one-remaining” priceless historic.

- Source: Racecar Engineering, 11th March 2010

Toyota Racing Development, on the other hand, have dealt with the financial hardships in a different way. They have announced the opening of their research and development facility in Cologne, Germany, to all customers. They are offering all components of design and testing, including CAD, wind tunnels, component testing rigs, machining and high fidelity race track simulators. The door is open to all levels from grass roots and privateer developers to automotive industry.

Source: Racecar Engineering, 12th March 2010

Red Bull Air Race

A Red Bull Air Race competitor is reported to have crashed his plane into the Swan River in Perth, during practice for the coming race. The Brazilian, Adilson Kindlemann, crashed into the river when his wing tip caught the surface of the water while turning out of one of the sets of inflatable upright cones. He was reportedly conscious when pulled from the river within a few minutes of the event and has only minor injuries following an evaluation at the receiving hospital. He had apparently been talking about the squally conditions during an interview earlier in the day. It is his first competitive event at this level.

- Source: Yahoo!7News, 15th April 2010

CAMS

CAMS has announced the launch of its road safety initiative, titled the “Ignition” program. It is allied to the FIA’s Decade of Action for Road Safety, which has the aim of reducing the worldwide road death toll by 5 million by the year 2020. Supported by Ferrari’s Felipe Massa, it targets young Australians, from 12 years of age. Talks in classrooms and local demonstrations are planned, with topics including “road craft, mechanical theory, discipline and vehicle handling.” Pilot events have already been conducted and it is planned to go nationwide during April.

- Source: CAMS Speed Read, March 2010, Issue 11.



Caught by the cameras





Sebastien Buemi's front wheels fly off after hitting the brakes into Turn 14 at the Shanghai circuit. The wheel tethers failed, apparently as they were tethered to the part of the hub that came away with the wheel. Although the wheel cleared the fence, no one was injured and Buemi had a relatively gentle brush with the barrier and gravel trap.

