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The Australasian Society for Motorsports Medicine and Rescue

Contents

Race control

Welcome to the second issue of 2011. I've not been able keep up the production rate of the previous 2 years, due to other commitments, but now that the ASMMR site (http://asmmr.yolasite.com/) is online, I hope to be able to release items of interest more rapidly via the site. The News section of the site has an RSS feed for those of you who like to use online readers to keep up to date and you can also keep in touch via Twitter (http://twitter.com/#!/TheASMMR). The newsletter might become a bi-monthly product as a result, but I'll see how it goes. The newsletter has some advantages and some people like being able to print it off.

The last few weeks have been particularly busy with the WRC event in Coff's Harbour due to be held this coming week. It's been a bit of a scramble to get everything finalised but it looks like being a good event. I was chatting to a Coff's Coast journalist today who told me that the atmosphere is very positive and the local population are very much looking forward to the event.

This issue looks at two clinical topics. First, coagulopathy of trauma and our pre-hospital role in its management (prevention). Second, there is a summary of a Victorian study looking at pre-hospital performance indicators and how they could lead to a change in transport time thinking.

In the last issue of the newsletter, there was a review of the quantity, quality and availability of motor sport medical and rescue resources online. Interestingly, while I was in Dublin, I did a quick miniature repeat and found that using a European based version of Google, that I got a better search result, with a number of UK based agencies popping up that offered information and courses in motor sports medicine and rescue.

In reply to the article in the last newsletter, Michael Henderson wrote to say that AIMSS is looking

to update their website and has taken steps to "reproduce our research results in a digestible format, with full papers to be available to members". Additionally, Andrew Fisher, OH&S Risk Management Coordinator at CAMS, wrote a letter which, with his permission, is published below, detailing CAMS' commitment to its responsibilities and duty of care to participants, members and spectators through the CAMS Safety 1st Strategy. He has provided a link to a number of risk management tools developed by CAMS and freely available, for use by motor sport clubs and event organisers to enhance compliance with civil legislation, sporting rules and duty of care. This resource includes packages for each type of motor car sporting event in Australia, from club to international level, and covers all of the required components for hosting, from checklists and forms for event organisers to material safety data sheets. If you want to know how to give a site induction (briefing) to competitors, officials or event organisers, which of the various reports are required for your event, from injury reports to clerk of the course reports, or what requirements there are for providing food and beverage at your event, it's all here. Where relevant, state specific forms and information are also available. There are samples of completed event plans to guide you through various aspects such as how to submit the medical response plan. It is quite a comprehensive resources and is available at http://cams.com.au/Safety/Safety_in_Motor_Sport/Safety_1st_Strategy.aspx

Good luck.

Matthew Mac Partlin

Clinical review

- Coagulopathy of trauma
- Transport times to a major trauma centre

Coagulopathy of trauma

Coagulopathy in the setting of trauma is bad. That's not a particularly startling revelation. Someone who has a significant hole in their vascular tree has a problem which can only be made worse if they are also coagulopathic. Plugging the hole takes priority.

Coagulopathy in trauma is a regularly discussed topic at almost all trauma meetings, with experience coming from both civilian and military practice, and its management has been the subject of much research and debate.

The bleeding that we see at an event will be due to the hole in the vessel, not a trauma-induced coagulopathy; that starts a little later. However, it is still worth knowing a bit about it, as we might be able to influence its occurrence and thereby the patient's subsequent outcome. Coagulopathy of trauma centres around three key factors, the so-called triad of death:

- Hypothermia – Temperature < 35C
- Metabolic acidosis – pH < 7.35, SBE < -2.0
- Relative or absolute clotting factor deficiency

Of these factors, there is not much we can do about the third at the trackside or the on-site medical centre (unless it is a fully operational trauma centre with blood product storage capability, though this would be unusual as majority practice is to transport a motor sport major trauma victim to the nearest trauma hospital with as short a delay as possible). The other two we can influence.

When a trauma victim is managed, they inevitably have all of their clothing removed in order to provide access to examination and intervention. Prolonged exposure, in combination with blood soaked clothing and bedsheets, can induce hypothermia which interferes with clotting system efficacy. This is easily minimised by keeping the patient covered as much as possible, particularly once the initial injury survey has been completed. Additionally warmed fluids should be used and, where possible, the environmental temperature of the work space where the patient is being managed should be set to suit the patient rather than the operators. One of the best markers of an effective trauma resuscitation is a patient who has a normal core temperature at the end of the process.

Metabolic acidosis can occur for a number of reasons in a trauma victim, including tissue hypoperfusion due to hypovolaemia, or rhabdomyolysis due to a (usually prolonged) crush injury. Early control of the patient's volume requirements helps to mitigate the development of a significant metabolic acidosis, which is another marker of good trauma management. There are a number of tricky aspects to this however.

The concept of limited volume resuscitation for penetrating torso trauma is now a largely accepted trauma practice, where a systolic BP target of 90mmHg is recommended when the transport time to a definitive management centre (i.e. the operating theatre) is going to be short (< 60 minutes). The optimal management for longer transport times (perhaps relevant for events located far from metropolitan centres, such as the Safari Rally) and for blunt trauma (the majority of injury mechanism in motor sports) is less well defined, due to evidence of lack of benefit, or simply lack of evidence.

Secondly, large volumes of resuscitation fluid, either crystalloid or colloid, will potentially dilute available clotting factors, inducing an iatrogenic coagulopathy. Trauma practice guidelines in both military and civilian environments have moved towards earlier administration of blood products with the development of massive blood transfusion protocols and refined packed red cell to FFP to platelet transfusion ratios (1:1:0.5-1). In military practice there has been a renewal of interest in whole blood transfusion for trauma, but this is likely to reflect their patient demographic and the availability of mobile donor units; i.e. healthy soldiers wandering around the camp. Given that it is rare that blood product would be available at a motor sports event, rapid stabilisation and facilitation of transport to a trauma centre is likely to be the most useful thing that we can do in this regard.

There are a few other reasons why a trauma victim might be coagulopathic:

Iatrogenic

- Antiplatelet agents; e.g. aspirin, clopidogrel, dipyridamole
- Anticoagulants; e.g. warfarin, dagibatran

Primary medical disorders

- vonWillebrand's disease – a platlet activation/aggregation disorder
- Haemophilia A or B – a clotting factor VIII or IX deficiency

- Idiopathic thrombocytopaenic purpura (ITP) – a quantitative platelet deficiency
- Thrombotic thrombocytopaenic purpura (TTP) and haemolytic uraemic syndrome (HUS) – illnesses that include a quantitative platelet deficiency as part of their spectrum
- Disseminated intravascular coagulopathy – a full scale clotting and fibrinolytic system failure with a number of precipitants, including extensive burns, massive blood transfusion and massive trauma

Of the list of causes above, only a few are relevant to the motor sport environment. In the hobbyist, amateur and semi-professional classes, older competitors may be taking antiplatelet agents for various illnesses. Warfarin is not specifically mentioned by either the CAMS or FIA regulations, but it would be fair to assume that a therapeutic INR is not compatible with competitor safety in motor sports and this should be picked up in the course of the medical assessment for a competitor license.

Primary coagulation disorders such as vonWillebrand's disease, the haemophilias and ITP are again not specifically mentioned in the CAMS or FIA regulations as exclusions to compete, however, as all competitors require a medical examination with disclosure of their medical history, the individual's risk of sigificant bleeding would be assessed as part of their fitness to hold a license.

TTP, HUS and the majority of causes of DIC should not present a problem in motor sports as the person will be too ill to compete and will be tucked into a bed in your nearest intensive care unit.

In summary, given the short access times that event medical crews have to competitor trauma victims, the cause of bleeding will be an open vessel, which needs direct compression or a tourniquet (Yes, tourniquets are back in vogue, thanks to military experience with exanguinating limb injuries in recent conflicts) and transfer to a definitive care facility. It will take some time for a trauma coagulopathy to develop, related to the nature and severity of the injuries and the treatment instituted. However, our actions can influence the subsequent emergence of a trauma coagulopathy and eventual patient outcome, with efforts to keep the patient warm and tailoring the resuscitation volumes to the needs of the patient, followed by stabilisation and rapidly facilitated transport to a definitive trauma centre.

Trauma retrieval time

Pre-hospital scene time following trauma is a source of many heated discussions at any trauma morbidity and mortality meeting you might chose to attend. There is good evidence that managing a trauma victim at an accredited trauma centre results in better outcomes. The accepted wisdom is that longer scene and transport (primary retrieval) times adversely affect morbidity and mortality. As a result, most guidelines advise transport directly to a definitive trauma centre, bypassing other hospitals, unless the interval period is going to be greater than about 20 to 30 minutes. This is generally not a significant problem for major metropolitan civilian and circuit motor sport trauma. However, rallies and other off-road events are often conducted far from major metropolitan centres and attending medics therefore need to make triage decisions between the shorter distance to the regional, non-trauma hospital or the farther away designated trauma centre; a decision process that can create a fair bit of angst.

At the recent SWAN XIX conference, hosted by Liverpool Hospital in the south-west of Sydney, a paper was presented outlining the results of a retrospective trial conducted by Ambulance Victoria and the Department of Epidemiology and Preventative Medicine at Monash University (not yet

published) that suggested there may be a bit more leeway. The basis for the trial was an attempt to validate current Ambulance Victoria key performance indicators, which were essentially selected ad hoc rather than as a result of justifiable evidence. The three performance indicators assessed were:

- total scene time > 20 minutes
- total pre-hospital time > 60 minutes (includes transport time)
- field triage to a major trauma centre

The outcomes measured were

- death
- total hospital length of stay
- hospital length of stay > 7 days

The inclusion criteria were all trauma patient managed between 2007 and 2009 with at least one of the following outcomes:

- death
- ISS > 15
- admission > 24 hours needing mechanical ventilation or urgent surgery

This resulted in a study population of 4,408 patients, who were mostly men (70%) and between:the ages of 15 to 55 years old (61.6%), a demographic not too dissimilar to motor sport competitors, though the co-morbidity list is likely to be a bit different.

When they analysed the numbers, unsurprisingly they found that triage to a major trauma centre was associated with improvement in mortality (Odds ratio 0.6, CI 0.5-0.9) and length of stay > 7 days (OR 0.8, CI 0.6-1.0). It's worth noting that the confidence interval for length of stay > 7 days includes unity (1.0), so that the true outcome may actually be no improvement in risk at all.

Interestingly, when they looked at the parameters of scene time > 20 minutes and total pre-hospital time > 60 minutes, they found an increased association with length of stay > 7 days (OR 1.4, CI 1.1-1.6 and OR 1.4, CI 1.2-1.7 respectively), but no difference in mortality (OR 1.0, CI 0.8-1.4 and OR 0.9, CI 0.7-1.2 respectively). In other words, a longer scene time and pre-hospital time might mean you spend a few more days in hospital, but did not increase your risk of dying. The presentation did not detail how much longer this population spent in hospital nor what kept them there.

This was a retrospective database review and so can only suggest association, rather than determine cause. The results may have been influenced by the population studied, local practices other than transport times and various forms of selection and reporting bias. There may also be differences between road and aeromedical transport not picked up by this study. However, it opens the door to more formal evaluations of current retrieval recommendations and guidelines and potentially allows for more lenient transport times which would increase the the retrieval range to a major trauma centre, with its associated improvement in mortality outcomes, for critically injured competitors at motor sports events, particularly rallies and other off-road events. To do so would also require the retrieval doctor or paramedic to have the confidence, experience and resources required to deal with longer periods in a difficult clinical environment. So the prospective interventional trial of tight versus lenient trauma centre transport times needs to be done, before committing to a change in practice.

Recent race results

After a brief lapse in form, Sebastian Vettel is back on top, taking out the Belgian GP at Spa ahead of Webber and a charging Jensen Button. This latest round was one of the more exciting races with impressive drives from both Button and a more in form Michael Schumacher, following some car breaking action at the first corner on the first lap.

Formula 1

1. Sebastian Vettel, Red Bull Racing - 259 2. Mark Webber, Red Bull Racing - 167 3.Fernando Alonso, Scuderia Ferrari Marlboro - 157 4. Jenson Button, Vodafone McLaren Mercedes - 149 5. Lewis Hamilton, Vodafone McLaren Mercedes - 146 6. Felipe Massa, Scuderia Ferrari Marlboro - 74 7. Nico Rosberg, Mercedes GP Petronas F1 Team - 56 8. Michael Schumacher, Mercedes GP Petronas F1 Team - 42	9. Vitaly Petrov, Lotus Renault GP - 34 10. Nick Heidfeld, Lotus Renault GP - 34 11. Kamui Kobayashi, Sauber F1 Team - 27 12. Adrian Sutil, Force India F1 Team - 24 13. Sebastien Buemi, Scuderia Toro Rosso - 12 14. Jaime Alguersuari, Scuderia Toro Rosso - 10 15. Sergio Perez, Sauber F1 Team – 8 16. Paul di Resta, Force India F1 Team - 8	17. Rubens Barrichello, AT&T Williams – 4 18. Pastor Maldonado, AT&T Williams - 1 = Jarno Trulli, Team Lotus - 0 = Heikki Kovalainen, Team Lotus - 0 = Narain Karthikeyan, Hispania Racing F1 Team - 0 = Vitantonio Liuzzi, Hispania Racing F1 Team - 0 = Timo Glock, Marussia Virgin Racing - 0 = Jerome d'Ambrosio, Marussia Virgin Racing – 0 = Daniel Ricciardo, HRT-Cosworth - 0

Next race: Round 13 0f 19 - September 11th, Monza, Italy

World Rally Championship

Controversy and conflict surround the conquering Citroen team and the top 3 placed drivers are still technically in contention with 4 rounds to go. The Mini team are now formally competing, widening the field a little, though they will take some time to settle in.

1. Sebastien Loeb, Citroen Total - 197 2. Sebastien Ogier, Citroen Total - 167 3. Mikko Hirvonen, Ford Abu Dhabi - 156 4. Jari-Matti Latvala, Ford Abu Dhabi - 96	5. Petter Solberg, Petter Solberg Racing - 94 6. Mads Østberg, M-Sport Stobart Ford - 56 7. Matthew Wilson, M-Sport Stobart Ford - 40 8. Kimi Raikkonen, ICE1 Racing - 34	9. Henning Solberg, M-Sport Stobart Ford - 32 10. Dani Sordo, MINI - 23 11. Federico Villagra, Munchi's Ford - 20 12. Juho Hanninen, Skoda Fabia S2000 - 13

Next event: The WRC arrives in Australia this coming week, with stages based around the Coff's

Harbour region. Round 9 of 13 – September 8th – 11th

V8 Supercars

1. Jamie Whincup 1895 2. Craig Lowndes 1797 3. Shane van Gisbergen 1502 4. Rick Kelly 1418 Jason Bright 920	5. Steven Johnson 1345 6. Mark Winterbottom 1321 7. Garth Tander 1321 8. Will Davison 1302	9. Alex Davison 1255 10. Lee Holdsworth 1140

Next round: L&H 500, Phillip Island - Sept 16th - 18th

MotoGP

Casey Stoner looks well placed to take an international motor sport championship for Australia.

1. Casey Stoner, Repsol Honda Team - 243 2. Jorge Lorenzo, Yamaha Factory Racing - 199 3. Andrea Dovizioso, Repsol Honda Team - 174 4. Dani Pedrosa, Repsol Honda Team - 130 5. Ben Spies, Yamaha Factory Racing - 125 6. Valentino Rossi, Ducati Marlboro Team - 124	7. Nicky Hayden, Ducati Marlboro Team - 105 8. Colin Edwards, Monster Yamaha Tech 3 - 84 9. Marco Simoncelli, San Carlo Honda Gresini - 80 10. Hiroshi Aoyama, San Carlo Honda Gresini - 77 11. Héctor Barberá, Mapfre Aspar Team - 62	12. Álvaro Bautista, Rizla Suzuki MotoGP - 49 13. Karel Abraham, Cardion AB Motoracing - 46 14. Toni Elías, LCR Honda MotoGP - 46 15. Cal Crutchlow, Monster Yamaha Tech 3 - 39 16. Loris Capirossi, Pramac Racing Team - 29

Next round: Round 6 of 18 - June 10th - 12th Silverstone, Great Britain.

Intercontinental Rally Challenge

A bit of a change in the standings as we make our way through elected drives and best-of results.

1. Juho Hänninen, Skoda Fabia S2000 – 98 2. Jan Kopecky, Skoda Fabia S2000 – 95 3. Freddy Loix, Skoda Fabia S2000 - 88 4. Bryan Bouffier, Peugeot 207 S2000 - 61	5. Thierry Neuville, Peugeot 207 S2000 - 60 6. Andreas Mikkelsen, Skoda Fabia S2000 – 56 7. Guy Wilks, Peugeot 207 S2000 - 47 8. Toni Gardemeister, Peugeot 207 S2000 - 28	9. Hans Weijs, Skoda Fabia S2000 - 18 10. Karl Kruuda, Skoda Fabia S2000 - 15 11. Michael Solowow, Ford Fiesta S2000 - 15 12. Bruno Magalhães, Peugeot 207 S2000 14

Next event: Round 8 of 11 – Sept 9th - 11th, Canon 45 Mecsek Rallye, Hungary

A letter from Andrew Fisher (CAMS) regarding the CAMS Safety 1st Strategy

Hi Matthew ,

thank you for the copy of the Newsletter I do not have a medical background but I always find them extremely informativte.

You touch on the CAMS Safety 1st Checklist in your article.

CAMS is responsible to its members for the provision of well-organised and competently-administered sporting activity, which is conducted safely, fairly and in a socially responsible manner, and which places the interest of the health and safety of its members above all else.

Compliance is required by civil legislation – both federal and state, by local councils, by sporting rules and even through the due diligence which is entwined through society and is reinforced by the ever-increasing litigious environment in which we now live.

Above all else we have a moral obligation to our fellow participants, families and friends to provide the safest possible environment which allows them to return home safely after each workday and/or event.

With that in mind it is essential that all event motor sport organisers, car clubs and motoring participants are aware that, legally, both they and CAMS have responsibilities and owe a duty of care.

CAMS has worked hard over the years to provide a combination of programs (including development of tools in risk management processes and making them widely available on the CAMS website) which have served well to balance the “scales of risk” of awareness and understanding of “off track (or stage!) safety issues.

In response to requests from many organisers and consistent with the principles of the CAMS Safety 1st Strategy (which is aimed enhancing CAMS existing approach to safety and risk management), physical and administrative/paperwork requirements have been reduced as much as possible without jeopardising the robust, transparent and systematic process which is required by organisers and CAMS to demonstrate adherence to OH&S and duty of care obligations.

It is however considered to be a vital protection for events, individuals, organisations and organisers against prosecution on OH&S matters that a commonly used, well known and documented (therefore transparent) safety management system to detail the process used by the sport to attend to its obligation in this area.

CAMS has also developed a number of other tools that may not be “exciting” to the sport but I hope will continue to ' provide a cultural change so as all participants in motorsport regardless of their role are active participants npt passive recipients of safety services.

Please follow the link for more information on CAMS Safety Tools
http://cams.com.au/Safety/Safety_in_Motor_Sport/Safety_1st_at_events.aspx

I look forward to your next newsletter.
Regards

Andrew

Caught by the cameras

For those who may not be sure, this is not a new breed of rally car nor is it a normal F1GP race tactic for overtaking. Vitaly Petrov, in his Lotus Renault, at the Malaysian Grand Prix, picked up some excess rubber on his tires, causing him to understeer and as he came back on to the track he launched off a bump. The car seat sits on the chassis base, about an inch off the ground, so the immediate concern was the axial load to his spine. He took some time to get out of the car, but fortunately suffered little injury. There were only two laps to go and he was looking good for 8th place at the time, running ahead of Lewis Hamilton.