

DR ABC: Emergencies and management of injuries

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[Editor: Rod Mitchell, formerly the senior DMO in Alice Springs, undertook this review and revision of the DR ABC and injury protocols as a project for his specialist training in anaesthetics. An edited version of his project report is presented here]

Summary

This project has sought to evaluate and revise current guidelines for the management of 'DR ABC/ Emergencies' and 'Injuries', as produced by CARPA for use in rural/remote Australia. The evaluation involved a telephone survey of guideline users and an audit of Royal Flying Doctor Flight Records. This was in order to examine the degree of dissemination of the guidelines amongst rural/remote practitioners, the degree of impact of the guidelines on current practise, the degree to which current practise is moving towards guideline recommendation, and the level of user satisfaction with the guidelines. It would seem that the guidelines are widely disseminated, and that guideline users are generally satisfied with their content. The extent of the impact of the guidelines on current practise, and the extent to which the current practise is approaching the 'best practice' espoused in the guidelines are more uncertain, though both appear generally positive. In response to the information gleaned during the evaluation, the revised guidelines have incorporated a new flow diagram for DR ABC, more illustrations, prompts to remind clinicians of the need to consider the administration of oxygen and intravenous fluids, improved accessibility to the common clinical scenarios, and less medical jargon.

Introduction

In response to a perceived need, CARPA has developed and refined a series of protocols over the last fifteen years to deal with health issues that are common and/or unique to the region. These protocols are presented in the CARPA Standard Treatment Manual (STM). Two such protocols have evolved for the initial management of loss of consciousness and the management of acute injuries. The former appears at the front of the manual, and is set out in a DR ABC format. The 'Injuries' guideline is found amongst the more general protocols, and offers a more comprehensive guide to treatment.

It was the purpose of this project to formally evaluate and rewrite these two protocols.

The author of this project worked as a District Medical Officer in remote Central Australia for the period 1994–99.

The guideline revision process

In the process of rewriting the CARPA ‘DR ABC/ Loss of Consciousness’ and ‘Injuries’ protocols, this review has endeavoured to adhere, where applicable, to the principles outlined in the National Health and Medical Research Council (NHMRC) publication *A guide to the development, implementation and evaluation of clinical practice guidelines* (1998). This document outlines the guiding principles, offers advice on guideline development, and considers pertinent legal issues.

The guiding principles

1. *‘Processes for developing and evaluating clinical practice guidelines should focus on outcomes . . .’*

Outcome measures for the DR ABC/Loss of Consciousness and Injuries protocols have proved difficult to quantify. The evaluation process will be discussed in detail later, but unfortunately the protocol has largely been driven by perceived, rather than measurable, outcomes. Nonetheless, the desired outcome has clearly been to reduce morbidity and mortality associated with sudden loss of consciousness and/or injury.

2. *‘Clinical practice guidelines should be based on the best available evidence and should include a statement about the strength of their recommendations . . .’*

There are multiple ‘emergency’ protocols in existence. The American Heart Association Resuscitation Guidelines printed in ‘Circulation’ (August 2000) represent a stated attempt to publish a consensus position based on the best available evidence pertaining to cardio-pulmonary resuscitation. The DR ABC/Emergencies protocol has thus been based on this document.

The ‘Injuries’ protocol has been based on the guidelines in the ‘Advanced Trauma Life Support’ Instructors Manual (1997) and ‘The Management of Acute Neurotrauma in Rural and Remote Locations’. For the sake of consistency, it has been cross-referenced against the other ‘trauma protocols’ in use in remote Central Australia. These include publications by the Top End Division of General Practice, Council of Remote Area Nurses of Australia and the Royal Flying Doctor Service (Central Division).

3. *‘The process of guideline development should be multidisciplinary and should include consumers . . .’*

The protocols being rewritten are used primarily by nursing staff and Aboriginal health workers, and to a lesser extent by medical practitioners and laypersons. The third edition was written by a medical practitioner (myself) and a registered nurse, with extensive reviews by consumers. This edition has been rewritten solely by a medical practitioner (myself). The review process has been multidisciplinary.

4. *‘Guidelines should be flexible and adaptable to varying local conditions.’*

Whilst originally written for use in Central Australia, the CARPA STM has found itself having to address an ever-widening readership. The use of the STM in the tropics, and in other states, has required addressing issues not found in Central Australia (e.g. jelly fish stings) and the addition of more area-specific information (e.g. phone numbers). However, management principles of loss of consciousness

and injuries are for the most part universal, so no particular geographical idiosyncrasies have needed to be addressed. The guidelines recognise that the epidemiology of emergencies and injuries is different in Central Australia, with higher rates of alcohol-related injuries, meningitis, and hypoglycaemia.

5. *'Guidelines should be developed with resource constraints in mind . . .'*
It is recognised that loss of consciousness/injury management equipment can be expensive, and infrequently used in the setting of a remote clinic which treats relatively few serious emergency cases. The protocols have avoided recommending strategies that require the purchase of such equipment. Defibrillators, extrication devices, certain airway management aids are therefore not included. Similarly, it is hoped that the recommendation of relatively few drugs (particularly antibiotics) will avoid wasteful expenditure.

6. *Guidelines are developed to be disseminated and implemented taking into account their target audience . . .'*
This has proved a particular challenge, as the STM is addressing a readership representing a large spectrum of experience and academic qualifications. The protocols are primarily intended for use by AHWs, medical practitioners and nurses. Within each of these groups there is a further spectrum of expertise. The intention has been that any individual can follow the protocols for as far as they feel comfortable, with reminders of the need to seek more senior advice when necessary.

The CARPA STM is now widely used throughout rural/remote Australia. Dissemination of the DR ABC/ Loss of Consciousness and Injuries protocols is achieved through the success of the STM as a whole. The evaluation of the DR ABC/Loss of Consciousness and Injuries protocols reveals a potential under-utilisation of these protocols, particularly by doctors and AHWs. The reasons for this are not clear, and almost certainly multi-factorial. The frequent comment 'too hard to understand' raises difficult issues regarding literacy and training. In terms of 'focus on outcomes' there is of course little point in having a carefully prepared protocol if nobody is using it!

7. *'The implementation and impact of the guidelines should be evaluated.'*
The current guidelines have been evaluated as part of the revision process. The evaluation of the new guidelines should occur when the new edition of protocols is updated in approximately four years time.

[Editor: An evaluation of the third edition of the CARPA STM was done in 2001. It found strong support for the STM among all clinicians and for development of the reference book, and found that every clinic visited in the NT (~50% of all clinics included) were using the STM.]

8. *'Guidelines should be revised regularly.'*

The CARPA STM is rewritten every four years. Given the relatively slow rate of significant changes to the management of DR ABC/injuries, at the level at which these protocols are addressing them, this is seemingly an appropriate time frame.

Guideline development

The process that the revisions of the Emergencies/Injuries protocols have followed has also been guided by the NHMRC recommendations.

The need for protocols dealing with emergencies/injuries is highlighted by the continued high prevalence of injury-related deaths in isolated areas. There are

almost twice as many injury deaths in Australia's most remote areas as elsewhere. Between 1979 and 1995 injury was the most frequent cause of death for Northern Territory non-Aboriginal males, and the second highest cause of death for Aboriginal males. In terms of 'years of potential life lost', (because injury tends to occur in younger people) in the NT in 1995 injury accounted for more years of life lost than all of the years of life lost from the combined total of respiratory disease, infectious disease, cancer, diabetes and renal disease. Of those deaths due to injury, almost forty per cent were due to road transport injuries.

Of course, protocols are only part of the answer in addressing the high rate of injury-related deaths, along with issues relating to alcohol consumption, excessive speeding, lack of restraints, and getting medical teams to isolated areas rapidly.

When ideas for earlier editions of the STM were being canvassed, users expressed a strong need for protocols outlining management of emergencies and injuries.

A multidisciplinary panel, the CARPA editorial committee, has already been convened to oversee the revision of all the protocols contained within the manual.

The purpose of the guidelines is defined as to minimise morbidity/mortality related to loss of consciousness from all causes, and morbidity/mortality related to injuries. The guidelines are now intentioned for use by health staff in remote/rural areas, including those beyond Central Australia. They provide a basis for early treatment, and are quite clearly not exhaustive. The primary focus of the intended readership is nursing staff and Aboriginal Health Workers, though the protocols are written such that medical practitioners will find a level of knowledge consistent with what they would be expected to provide in the early phases of treatment. The NHMRC recommend that different versions of guidelines should be developed for different audiences. This is a somewhat contentious issue regarding emergencies/injuries, where the basic treatment principles remain the same, i.e. 'ABC'. Certainly the concept of a universal reference, which all clinic staff refer to, has proved a popular model.

[Editor: 'One book for all users' was strongly supported by the evaluation of the third edition of the STM in 2001.]

The formulation of the guidelines has occurred after reference to appropriate resources (outlined above). After the initial draft, the guidelines have been widely circulated for comments amongst consumers and a selection of interested 'experts'. The latter include one senior specialist from each of the disciplines of anaesthesia, emergency medicine, trauma surgery, neurosurgery, and infectious diseases.

Dissemination and implementation of the guidelines will to a large extent rely on the continued uptake and support of the CARPA STM that has occurred over the last decade. This support in turn relies on the involvement of users in the development of the protocols. The production of a wall chart displaying a DR ABC algorithm is being considered. Health educators will continue to be encouraged to promote practice policies in line with those appearing in the manual.

An evaluation mechanism is in place for the manual as a whole. Ideally, each individual protocol would be evaluated, using health outcomes as end points, or more pragmatically, as has occurred with this revision of the DR ABC/Emergencies and Injuries protocols. Unfortunately, the resources are not available for this to occur, so the future evaluation of these particular protocols remains uncertain. The

protocols will be revised in four years time, along with the rest of the manual.

[Editor: CARPA and other groups interested in the application of evidence-based health care are working on ways to promote and monitor the implementation of evidence-based guidelines. Simple mechanisms, applied at the local clinic level are likely to be important such as quality assurance auditing of clinical practice as is already done in some settings. Health service management practices that help to overcome barriers to implementation are also very important]

Evaluation of the current guidelines for injury

Methods

In keeping with the recommendations proposed by the NHMRC in their publication *A guide to the development, implementation and evaluation of clinical practice guidelines*, the current edition of the DR ABC and Injuries guidelines have been assessed for the following factors.

1. *Guideline dissemination.* An assessment was made as to the success of the degree of dissemination. This was based on the number of copies sold and on a phone survey of users, who were asked the following questions: 'Have you ever read the DR ABC protocol at the beginning of the manual?'; and 'Have you ever read the Injuries protocol in the middle of the manual?'

2. *Whether or not the guidelines have contributed to any changes in clinical practice.* During the same phone survey respondents were asked the questions: 'Have you read the DR ABC protocol during the time that the patient was in your care?'; and, 'Have you ever read the Injuries protocol during the time that the patient was in your care?' This does not directly address the question of whether or not the guidelines changed clinical practice. It was felt that practitioners who are reading the guidelines during the time they are actively treating a patient could reasonably be assumed to be following its recommendations, thus progressing the stated aim of the guidelines to minimise morbidity and mortality. I also believed that practitioners may feel defensive if they were directly asked if the guidelines had changed their management of any particular case, suggesting they had 'forgotten' something important, and therefore bias the responses.

3. *Whether or not clinical practice is moving towards the guidelines recommendations.* This involved consideration regarding what information was important, but also accessible. To fully assess patient management prospectively was beyond the resources available. To do so retrospectively would entail examining patient notes in health clinics. Given the isolated nature of these clinics, this was not logistically possible. The ethical dimensions of such a task is also problematic. I considered examining hospital notes to try to ascertain the efficacy of pre-hospital patient management, but felt that RFDS and/or St Johns Ambulance Service interventions would obscure 'bush' management. I finally decided to review eighteen months of 'code 1' (i.e. 'medical escort required') Royal Flying Doctor Service evacuations from remote Central Australia into Alice Springs, as the RFDS remains the common destination point for the majority of seriously injured patients in Central Australia.

Rather than generally assess the patient management notes to ascertain the level of care, I chose several markers. Given that the guidelines emphasis the need to focus attention on the basic tenets of 'ABC' management, I decided to simply assess the frequency of administration of oxygen, cervical spine protection, and

intravenous fluids, and whether the respiratory rate had been noted on the flight record. If these basic strategies are being implemented, it demonstrates an appreciation of the most important principles of trauma management.

Where these interventions had not occurred it was further assessed, on the basis of the information available, whether they were indicated. For example, if a young child was evacuated with a suspected head injury, but was fully alert, it was deemed appropriate for the health worker not to have attempted to gain IV access. Where the first people on the scene were laypersons, only first aid interventions were possible.

The RFDS records whether oxygen, cervical spine protection and intravenous fluids are 'commenced' or 'continued', making this information relatively accessible. Of course, the quality of the information gleaned is dependent on the quality of record keeping.

4. Relevance, ease of access, clarity, how much information they contain, and general user satisfaction. During the phone interviews, respondents were invited to suggest weaknesses and possible improvements of the current guidelines.

The NHMRC also recommends an economic evaluation, but this was felt to be outside the scope of this project.

The most critical question of 'Have health outcomes changed?' was given careful consideration. A randomised control trial was deemed to be unrealistic. Thus, this study has contented itself instead with evaluating the factors outlined above.

The phone survey was conducted by one person (myself) over a period of several weeks, and included fourteen Aboriginal Health Workers, fourteen registered nurses, and twelve doctors. The twelve doctors represent virtually the entire remote Central Australia clinical medical workforce. The AHWs and nurses were primarily practitioners with whom I have worked. The advantage of this approach is that I believed I would obtain relatively honest answers, and all these practitioners are experienced 'bush staff' with a good knowledge of information required to work in remote areas.

The disadvantages are that more experienced practitioners are probably less likely to refer to a protocol during an acute situation, thus biasing their responses, and the survey sample quite clearly is not a 'random' selection.

Results

1. Dissemination of guidelines

Over eight thousand copies of the third edition of the CARPA STM have been sold. The manual is officially endorsed as part of NT Department of Health and Community Services' policy. The manual has been bought by health clinics throughout Central Australia, the Top End, northern South Australia, and remote areas of Queensland and Western Australia

Medical practitioners were asked what resources they do use for dealing with emergencies. All replied that foremost they rely on their own experience, which as a group they felt very confident in. Several mentioned seeking help over the phone from more senior colleagues. Two said they refer to the CARPA guidelines after they have treated a patient, as a checking process.

The three cases of recorded tachypnoea (>30) were all recognised as being significant chest injuries. Two patients had intercostal catheters inserted. The third patient had two 14g IV cannulas inserted (oxygen saturation 74% on room air, three days after a motorcycle accident on a remote cattle station, with significant chest pain). It was elected to fly at ground level cabin pressure, as the flight nurse was not comfortable inserting an intercostal catheter.

In light of the findings associated with reviewing these Code 1 records, a heading entitled 'All badly injured patients require oxygen and intravenous fluids' will be placed at the top of each page of the Injuries guidelines. The possibility of incorporating a simple diagram of a patient receiving oxygen, intravenous fluids and cervical spine protection — to be inserted at the top of each page — is also being considered. The importance of measuring and recording the respiratory rate has been further highlighted.

1. Protocol reading

Have you ever read the DR ABC protocol? (Number and (%) of respondents)			
	Aboriginal health worker	Registered nurse	Medical officer
Yes	4 (29%)	10 (71%)	8 (67%)
No	10 (71%)	4 (29%)	4 (33%)

Have you ever read the Injuries protocol?			
	Aboriginal health worker	Registered nurse	Medical officer
Yes	4 (29%)	12 (86%)	5 (42%)
No	10 (71%)	2 (14%)	8 (58%)

2. Impact on clinical practice

Have you ever read the DR ABC protocol during the time that you were actually looking after a patient? (Number and (%) of respondents.)			
	Aboriginal health worker	Registered nurse	Medical officer
Yes	2 (14%)	4 (29%)	1 (8%)
No	12 (86%)	10 (71%)	11 (92%)

Have you ever read the Injuries protocol during the time that you were actually looking after a patient?			
	Aboriginal health worker	Registered nurse	Medical officer
Yes	4 (29%)	11 (79%)	3 (25%)
No	10 (71%)	3 (21%)	9 (75%)

3. Concordance of clinical practice and guideline recommendations

Intervention administered	Cases indicated	Cases administered	Cases not administered
Oxygen therapy	52	24/52 (46%)	28/52 (54%)
Cervical spine protection	47	23/47 (49%)	24/47 (51%)
Intravenous therapy	51	39/51 (76%)	12/51 (24%)

4. Respiratory rate

Respiratory rate	0–13	14–30	>30	Not recorded
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Number of cases 1 (RR=10) 49 3 9

General user satisfaction

At the conclusion of the phone interview, respondents were asked if they had ‘Any particular problems with, or suggestions for improving the protocols?’

No particular themes emerged as predominant. Several AHWs made comments about difficulty interpreting the guidelines, and requested simpler language, and more pictures/diagrams.

Discussion of results

The widespread sales of the manual have ensured that the protocols of interest have been widely disseminated. Previous studies have confirmed the ubiquitous nature of the CARPA STM in Central Australian health clinics.

AHWs are employed in the great majority of remote health clinics in Central Australia. The fact that less than a third of those to whom I spoke had actually read the guidelines suggests a failure in dissemination to this group (remembering that they represent a more experienced cohort). This likely reflects literacy levels, a view reinforced by frequent comments of ‘too hard to understand’, and ‘more pictures’. These comments have been borne in mind in the writing of the new edition. However, as one health worker educator has emphasised, ‘increasing the font size may help but there is nothing you can do to make up for missing out on years of basic education’. There is certainly merit to the concept of having more AHW input into the writing of protocols.

These findings confirm that nurses are regular users of the guidelines, whilst AHWs and doctors refer to it less frequently. Nurses by far see the bulk of patients in remote clinics, so in that sense the guidelines are impacting on clinical practice. However, in that medical practitioners are likely to be involved in the early stages of a ‘DR ABC’ scenario, the guidelines are having little impact through doctors. Increasing the readership amongst doctors may well prove difficult, as long as they perceive no need to do so.

Where the number of recorded interventions is low it is difficult to know whether this reflects a lack of intervention, or a lack of attention to recording. One patient with an intercostal catheter was not recorded as receiving oxygen, whereas one would assume that the practitioner with the skill to perform this intervention would have the knowledge to appreciate the need for oxygen.

1. Oxygen therapy: Of those cases where oxygen therapy was seemingly indicated, it was only recorded as having been administered pre-evacuation in less than 50% of cases, indicating a potential lack of appreciation for this basic manoeuvre.
2. Cervical Spine Protection: Of those cases where formal cervical spine protection was apparently indicated, it was only recorded as having been instituted in approximately 50%, similarly reflecting a potential short-fall in this aspect of trauma management.
3. Intravenous therapy: Of those cases where IVT was seemingly indicated, it was recorded as having been administered in 76%. Intravenous therapy is more likely to be recorded as it recognised as a more invasive procedure than oxygen therapy, which is sometimes overlooked as being ‘a given’. Furthermore,

remote area staff are often aware of the need to 'put in a drip' in an emergency. The rate of fluid administration, which is critically important, was not recorded.

The third edition CARPA guidelines suggest that a respiratory rate outside the limits of 8–30/minute demands attention. It was pleasing that those cases with respiratory rates outside these values were recognised as having significant chest injuries.

One practitioner, with many years of remote clinic experience, made a thoughtful comment that the most common head injury seen is that of the drunk, aggressive man bleeding heavily from a head injury, but the management of such an injury is at the end of the Head Injury section. Principles of emergency management for severe trauma (EMST) have been followed, thus management of this scenario details careful attention to Airway, Breathing and Circulation, with subsequent advice on GCS (Glasgow Trauma Scale), checking pupil responses, the use of Mannitol etc. This is all very sound practice, but appears too wordy and cumbersome for the isolated practitioner who wants immediate help with stopping the spurting arterial bleeder in the semi-conscious inebriated patient with the often-attendant stress of hovering distressed relatives. Thus, a balance must be struck between providing what by the author is seen as 'best practice', and what by the consumer is perceived as helpful, practical advice. If the consumer feels the advice is idealised, the protocol will gather dust on the shelf

Similarly, the patient with the heavily bleeding limb causes frequent angst. Previously, this was at the end of the 'Circulation' section, after information about the recognition and treatment of hypovolaemic shock. Immediate management of this scenario has been relocated to the beginning of 'Circulation'.

Guideline revision

Through feedback from the evaluation process, the guideline revision has attempted to address the following issues.

1. More flow diagrams and pictures. The DR ABC protocol for the immediate management of sudden loss of consciousness now incorporates a flow diagram with a series of yes/no options. Diagrams of life-threatening trauma conditions, application of oxygen and hard collars, and pressure application to bleeding points have been added.
2. Improved layout. As mentioned earlier, several remote area practitioners expressed difficulties and frustration in rapidly finding advice on the management of the common trauma scenarios they faced. (Examples included the young man exsanguinating from the self-inflicted 'sorry' cut to the groin and the inebriated patient bleeding profusely from a head wound.). In response to these comments, the sections have been relocated to the beginning of the 'Circulation' and 'Head Injury' sections, respectively, to improve accessibility.
3. Attempts have been made to simplify the language used throughout. The use of medical jargon has been minimised. The simple language of the manual has in the past been identified as being critical to its success.
4. Potential inadequacies in the administration of oxygen and intravenous fluids have been identified. These have sought to be addressed through the insertion of a 'prompt' at the top of each page reminding readers 'all badly injured patients need oxygen and intravenous fluids'.
5. I have attempted to adapt the reference guidelines to local conditions whilst still maintaining key policy directions. The two major issues have been the sheer volume of the references, and the fact that they have been written

primarily for doctors (and include in-hospital management). In addressing the first issue, I have endeavoured to select only the fundamental steps, with little expansion and detail. Addressing the latter issue has required simplifying medical jargon, deleting procedures not applicable to non-medical staff, and focusing on the pre-hospital care. Thus, for example, airway management is confined to opening, clearing, securing with an oropharyngeal airway, and applying oxygen. References to intubation and surgical airways have been deleted.

Conclusions

This project has sought to evaluate the current guidelines in the CARPA STM for the immediate management of sudden loss of consciousness and injuries. A formal evaluation involving a randomised control trial was deemed beyond the scope of the available resources. The evaluation, conducted through phone interviews of remote area practitioners and reviewing RFDS flight records, provided some insight into the degree to which the current guidelines have been disseminated and impacted on clinical practice, to what extent clinical practice parallels guideline recommendations, and identified perceived shortfalls.

Registered nurses, who conduct the majority of face-to-face clinical care in remote Central Australia, usually have a copy of the guidelines, have at least read the DR ABC guidelines, and have read and used the Injuries guidelines during clinical care. Aboriginal Health Workers seem far less likely to have read or used the guidelines, in keeping with their feedback that they find the guidelines too difficult to understand. Medical Officers report little use of the guidelines.

Evaluation of how well current clinical practice parallels guideline recommendation suggests that basic manoeuvres — such as oxygen administration, cervical spine protection and initiation of IVT — are being under-utilised. This is of concern, while recognising that the apparent shortfalls may in fact merely represent poor record-keeping on RFDS flight charts, or that good reasons for not instituting these therapies may have existed.

The guidelines have been rewritten bearing all of the above in mind. Whilst the CARPA STM continues to enjoy widespread readership, the role of specific guidelines for the management of sudden loss of consciousness and injuries is supported, though their impact remains somewhat enigmatic.

The overall impact of the guidelines is dependent on their successful broader integration with other aspects of clinical care, including peer review, continuing medical education, and quality assurance.

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I also acknowledge the National Health & Medical Research Council document A guide to the development, implementation and evaluation of clinical practice guidelines, which provided the basic template for the guideline revision that this project has conducted.

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