

## AMMA JOURNAL VOL 6 ISSUE 2

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### Abstracts from the Literature

by  
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**Macintyre P. Treating acute pain: The Royal Adelaide approach. Medical Review (Journal of AMA SAJ) 1997; Feh:10 - 1**

**Comment:** Major improvements in the delivery of analgesia, especially post-operative, are detailed. The Royal Adelaide Hospital Acute Pain Service has treated over 13,000 patients since 1989. Most patients receive Patient Controlled Analgesia (PCA). but epidural analgesia is used increasingly (currently 25%).

Reasons for the inadequacy of older opioid regimes are a) the variability between patients of minimum effective analgesic concentration (MEAC), b) the wide differences in intra- and interpatient peak blood concentrations, and c) the wide differences in times to peak concentration following injection of opioid.

Age better predicts opioid requirement than does weight. (100-age) mg approximates the average 24hour requirement, however, an 8-10-fold dose variation occurs. Sedation is a more reliable and earlier sign of over-administration of opioids than is respiratory depression. Periodic hypoxia may occur even with correct dosage. hence all patients receive supplemental oxygen.

Side effects are similar with morphine and pethidine although pruritus is more common with the former; however, nor-pethidine toxicity dictates the use of morphine in the first instance.

**Hocking G, de Mello WF. Battlefield analgesia- A basic approach. J R Army Med Corps 1996; 142:101-2**

**Comment:** The authors suggest a pain management protocol for use in the field where medical expertise or assistance is limited or not immediately available. Current civilian practice is used as a basis, and some of the points in the above article (Macintyre) are repeated. Use of a 10 mg morphine autoject is assumed, and justified by the fitness of servicemen (ASA classification 1 or 2) logistics issues. Predicted analgesic requirements (based on age) and (unreported) trials by the authors. An analgesic algorithm<sup>1</sup> is commenced after cardiorespiratory stability is obtained by ABCD (ie after primary/secondary survey as appropriate, according to EMST or ATLS protocols). If pain is present, 10 mg of morphine is delivered.

Hourly observations are made, with two hourly administration of 10 mg boluses of morphine if the patient is stable and in pain. Respiratory rate (>8 /min), pulse rate and sedation score (SS Alert or responding to Voice) are monitored to titrate doses. This is of course in addition to the usual monitoring of the battlefield casualty for requirement for early medical assistance or evacuation. The simplicity of the algorithm is attractive to the likely user (casualty) or administrator (buddy).

**Murray R. Guidelines for fluid replacement during exercise. Aust J Nutr Diet 1996; 53(4 Suppl): S17-S21**

**Comment:** Optimal physical performance requires minimisation of dehydration. Even low levels of dehydration (<2%) impair cardiovascular function and thermoregulatory response. Consuming fluid in direct proportion to sweat loss maintains these important physiological functions and significantly improves exercise performance, even for exercise of only one hour. Athletes (and, one would presume military personnel) are prone to 'involuntary dehydration' because fluid re- placement during exercise is generally only 50% of that required. Losses of two litres per hour or more can occur during exercise in warm, humid environments.

Fluid replacement at frequent intervals (15 minutes) is better than larger boluses less frequently (1 hour). The paper also discusses the latest recommendations made by the American College of Sports Medicine on 'Exercise and Fluid Replacement'.

Carbohydrate ingestion provides an additive benefit in improving exercise performance, independent from preventing dehydration. The recommended carbohydrate replacement is 30-60 grams per hour. Sports drinks usually contain 60-70 grams carbohydrate per litre (6-7% carbohydrate). Higher concentrations (e.g. soft drink, fruit juices) will impair water absorption and exceed the body's capacity for utilisation of exogenous carbohydrate and can slow gastric emptying.

Sodium replacement of 0.5-0.7 grams per litre is recommended. The sodium content of sweat varies enormously, up to one gram per litre. The sodium content of sports drinks is not given, although it does improve palatability and ingestion rates.

**BenGal S, Lowe J et al. The role of the knee brace in the prevention of anterior knee pain. Am J Sports Med 1997; 25(1):118-22**

**Comment:** This is reputedly the first prospective study looking at knee braces as prophylaxis for the anterior knee pain syndrome (AKPS). AKPS is a common phenomenon in physically stressed active young persons. It is associated with repetitive knee bending under load, and the pain can be triggered by prolonged sitting or stair climbing. Predisposing factors appear multifactorial and standard treatment modalities (rest, NSAID's, physiotherapy, knee bracing) have variable success. The incidence in military recruits can be up to 30%.

The study group numbered 80 fit asymptomatic 18-25 year old people initially, although 60 completed the study (43 male, 17 female): 27 wore knee braces with a silicone patellar support ring with exercise, 33 did not wear a brace at all. An 8 week, 6 hours per day, training programme ensued with middle and long-distance running, obstacle courses, navigational runs and resistive exercises. 54% of male non-brace users suffered AKPS, while only 19% of male brace users suffered AKPS. Results were not considered significant among the female trainees due to the small sample size. Perhaps braces should be issued routinely for use during recruit training!

**Tetzlaff K, Neubauer B, Reuter M, Warninghoff V. Pulmonary barotrauma of a diver using an oxygen rebreathing diving apparatus. Aviat Space Environ Med 1967; (12):1198-200**

**Comment:** A 22 year old fit German Navy combat swimmer performed a training dive with a closed oxygen rebreathing apparatus (LAR V, Draegerwerk AG) in the Baltic Sea to a maximum depth of 7 metres following normal procedure. Breath-holding was denied but coughing occurred during the dive.

Several hours after surfacing, retrosternal discomfort, fullness in the throat and slight hoarseness were felt. He presented the following day. Examination was normal, in particular no subcutaneous emphysema. Plain radiography revealed a radiolucent streak along the left mediastinal border in the region of the pulmonary artery, not present on routine chest x-ray 6 months previously. Subsequent plain X-ray and CT on day 4 were normal,

however spiral volumetric CT revealed a small subpleural emphysematous bulla next to the left ventricle. It was still present on follow-up 5 and 15 months later, suggesting that it was a pre-existent lesion.

Pulmonary barotrauma (PBT) of ascent is the most common complication of compressed air diving. Relatively small transmural pressures of 10 kPa can burst lung tissue. There are very few cases reported by other gases.

The emphysematous gas in this case was calculated to be 71% oxygen (following a three-breath washout pre-dive). Given that oxygen is cleared by metabolism as well as diffusion, the authors suggest that the relatively high residual nitrogen load accounts for the delayed clearance of the emphysematous gas. A six breath washout is recommended (oxygen rises to 85%). Three minutes of pre-breathing is required to reduce the nitrogen fraction to 4%.

Spiral CT scanning of any PBT is recommended to detect pre-existent lesions which may predispose to a recurrence. The incidence of bullae is probably higher than realised because they are often not revealed by plain x-ray, however outline CT is not recommended.