Highlights from this issue

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The promise of AI and why it matters

The promise of artificial intelligence (AI) in healthcare with potential applications across different areas of medicine, not least emergency medicine (EM)is beguiling. Who would have thought that the Tin Man from the fairytale, the Wizard of Oz, singing "If I only had a heart" would be partially realised in terms of human intelligence. Fiction is replete with such characters, we have imagined and fantasised about such creations long before we had the science or technology to bring them to life. Artificial Intelligence is a broad term to describe machines that can understand, act and learn with human like intelligence. Emergency care globally faces enormous challenges, with ever increasing numbers of patients and too few clinicians to treat them. Equally the expectation that we can improve patient experience while simultaneously reducing the costs of healthcare is at odds with reality on the ground. AI and machine learning (ML) can offer solutions to some of these problems as it allows us to manage large amounts of data, it reduces demands on resources, thus, tasks that previously required human intelligence can be performed in greater and more efficient ways and in many situations, AI makes better decisions than humans. Despite this, the potential of AI and machine learning (ML) in EM has not been fully realised to date. Papers in this issue give us greater insight into

the some of the reasons why this might be the case. The Editor's choice this month is an enlightened and comprehensive practice review by Ramlakhan and colleagues from Sheffield of AI, ML and deep learning. This paper is intended to serve as a primer for clinicians and researchers in understanding AI methods and their application in EM, it also provides a framework for interpreting AI research. A companion paper also by Ramlakhan and colleagues provides a more detailed exploration of the key issues for clinicians and researchers to consider in the process of developing an AI model. Having read the Ramlakhan papers and gained deeper understanding of AI and ML it is worthwhile reading the paper by Marincowitz and colleagues from Sheffield. They conducted a study which highlights some of the challenges of applying ML in emergency medicine. They developed a decision rule using traditional statistical techniques to see whether patients with mild traumatic brain injury could be safely discharged from the ED. They aimed to transparently report a machine learning approach to assess if the predictive accuracy could be improved. Interestingly they found no clear advantages over the traditional prediction methods, they acknowledge however that models were developed using a smaller data set due to the need to divide it into training, calibration and validation sets. They suggest future research should focus on developing models / processes that provide advantages over traditional techniques in predicting outcomes thereby enabling humans and machines to work together in the areas that they each excel. Undoubtedly AI holds huge promise but ultimately the human touch and heart can never be replaced, it is the essence of who and what we are about in EM.

Other matters of the heart also feature in this issue relating to out of hospital cardiac arrest (OHCA).

This includes the Reader's Choice which is a paper about OHCA. No-flow time is one of the most important determinants of outcomes after out of hospital cardiac arrest, so it was interesting to read the paper by Shibahashi and colleagues from Tokyo. They conducted an observational study to investigate the association between the initial shockable cardiac rhythm and the no- flow time and evaluated the diagnostic accuracy

of initial cardiac rhythm in identifying short no –flow time duration in patients with OHCA. Perhaps surprisingly they found that although there was a significant association between the initial shockable cardiac rhythm and no flow duration, initial shockable cardiac rhythm was not a reliable surrogate of short no –flow duration after OHCA.

Still on the topic of OHCA, we don't often have papers that have some reference to adolescents, so I was curious to read a paper by Privat and colleagues from France of their study which described the characteristics, outcome, and factors associated with survival of non-pubescent children, adolescents and adult patients with OHCA. OHCA among children and adolescents thankfully is uncommon as compared with adults. International guidelines for out of hospital cardiac arrest (OHCA) use puberty to differentiate children and adults. The authors used data from the French national cardiac arrest registry and included 934 children, 433 adolescents and 26952 adults. They found frequency of respiratory aetiologies and shockable rhythm were common in adolescents and adults and different between children and adolescents. They conclude from their study that puberty as a threshold in international guidelines seems to be relevant.

Another interesting study from France explored the performance of emergency physicians in identifying shockable rhythms using a manual defibrillator. EPs can use a manual or an automated defibrillator to provide defibrillation in OHCA but their performance using a manual defibrillator as opposed to an AED is not well known. Derkenne and colleagues conducted a study to estimate the sensitivity/specificity and speed of shock/no shock decision making by pre hospital EPs for shockable or non-shockable rhythm as well as their preference for manual vs automated defibrillation. They analysed results for 190 physicians. Their findings are very interesting, they found global sensitivity and specificity were comparable to published AED studies. VT and VF were rapidly recognised with very good sensitivity, however, decision making for fine VF or asystole and PEA was less accurate. This paper is further discussed in an excellent editorial by Leech and Perkins.

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