

## Point of view

### Thinking in the critical care unit

To manage the critically ill patient effectively, the intensivist is required to have a broad knowledge of critical illness, a range of technical skills and the appropriate attitudes and values.

However, effective management will not be achieved unless the patient is treated by a 'thinking' intensivist; employing cognitive ability, with its mix of knowledge, comprehension, analysis, synthesis and evaluation, which has been trained to understand that an accurate diagnosis is necessary before an effective plan of management can be formulated.

In the management of any patient the diagnosis is paramount. It leads the clinician to consider the natural history of the disorder and how it may be altered with treatment. The standard process requires a clinical examination, investigations, integrating these findings to assess diagnostic probabilities, and choosing the therapeutic plan guided by risks, benefits and patients preferences.<sup>1</sup> Treatment of the patient follows, with the clinician monitoring the progress of the disease and measuring the beneficial and adverse effects of therapy.

In the critically ill patient, resuscitation (which is preceded by a brief cardiovascular, respiratory and neurological examination) is often required first. When the patient is stable, the diagnosis and treatment of the underlying disorder is the main priority.

However, there are some patterns of 'thinking' that are not particularly helpful. For example, resuscitation and the continued treatment of abnormal physiological variables, using catecholamine infusions, broad spectrum antibiotics, mechanical ventilation, etc, to treat a pathophysiological diagnosis of 'sepsis with multiorgan failure', may occur with little further thought. The underlying diagnosis (e.g. chronic atrial fibrillation with superior mesenteric artery embolism and infarcted small bowel) and its management, if not forgotten, appears to be relegated to a low priority. Also with advances in the non-invasive diagnostic techniques (e.g. spiral computed tomography, magnetic resonance imaging) and bedside monitoring (e.g. ultrasound), the clinical method in some instances appears to have been rendered obsolete.

The reasons for this are largely the inability to gain a reliable history easily from the critically ill patient (as they may be agitated, confused, obtunded, or uncon-

scious) and the fact that physical signs, particularly when taken in isolation, are notorious for being unreliable.<sup>2</sup> However, a history is vital and can be taken, if not from the patient then from a close relative, family doctor, ambulance attendant or anybody who has relevant information. It just takes a little extra effort. In two reports studying the value of the history and examination, the correct diagnosis was reached after reading the referring letter and performing a history and physical examination in up to 80% of patients.<sup>3,4</sup>

While it is understood that there may be inaccuracies in the history and physical examination, surprisingly there is often an assumption that the various investigations we use in the management of the critically ill, have an excellent reliability and accuracy. Considerations of sensitivity and specificity, pretest probability and predictive value of a test are often forgotten, particularly when numerous tests are ordered at the same time to decrease the likelihood of missing a disorder (i.e. to increase the sensitivity). However, this practice also increases the likelihood of a false positive result (i.e. reduces the specificity), increasing the likelihood of a false diagnosis that demands (inappropriate) treatment.

Yet the power of the clinical method lies not only in the standard of the history and examination and the intelligent use of investigations, but also in the way that clinicians tie the pieces together to reach a diagnosis. Numerous methods are used to problem solve, although it appears that the 'hypothetico-deductive' (i.e. where each new piece of information is validated then it directs further action) approach is the commonest and strongest of all, and appears to be the basis of clinical problem solving.<sup>5-9</sup> While other methods (e.g. pattern recognition and the algorithm) are used from time to time and with effect, they have weaknesses.

For example, 'pattern recognition' is skill-based and largely visual, with the 'spot diagnosis' being the classical example. It can lead to an inappropriate 'jumping to a conclusion' or a wrong diagnosis if used indiscriminately, particularly by the inexperienced.

The 'algorithm' is rule-based. The clinician progresses along one of a number of preset paths, with divisions, which when followed ultimately lead to the correct diagnosis. However, it is not particularly suitable for patients with multiple symptoms or complex illnesses,<sup>10</sup> as the 'given state' (i.e. ventricular fibrillation, asystole, hypernatraemia, hypokalaemia, etc.) assumes that one has made a correct diagnosis, and to achieve the 'desired' or 'terminal state' one usually has to choose between a 'yes' or 'no'. There is little ability to have comorbid conditions included, grades of severity for symptoms or signs, as well as the presence of more than one diagnosis. Moreover, each problem is evaluated independently, rather than within the framework of a prior diagnostic hypothesis.

While some algorithms (e.g. protocols) are useful in the critical care unit (particularly drug infusions for sedation or pain relief for the mechanically ventilated patient), units that are run predominantly by protocols are run predominantly by nursing staff (adhering to protocols), and function largely as a service units (i.e. open format) to a referring medical practitioner, rather than as a unit where patients are managed by an intensivist (i.e. closed format).<sup>11</sup> In two recent studies the open unit format was associated with a higher mortality when compared with the closed unit format.<sup>12,13</sup>

With the diagnosis at hand, treatment also requires 'thinking', as good clinical judgement is needed, particularly now that we are inundated with meta-analysis and mega-trials. When evaluating 'best available external evidence' good clinical judgement must be used to ensure that the evidence is being applied appropriately to the individual patient. Apart from the inaccuracies of meta-analyses<sup>14</sup> and inexact conclusions that are presented under the guise of evidence based medicine,<sup>15</sup> to convert the reported benefit of any trial to clinical practice, the clinician has to gauge whether the trial cohort fits the profile of his or her patient (or whether the patient would have been excluded), and also has to estimate the susceptibility of his or her untreated patient in relation to the control group described in the report.<sup>16,17</sup>

As with other medical specialties, there are no short cuts to 'thinking' in the management of the critically ill patient - which has been noted before.

"Life is short, and the art long; the occasion fleeting; experience fallacious, and judgement difficult."

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