Rehabilitation in critical care: Barrier, hurdle or brick wall?

As mortality rates from critical illness and multi-organ failure improve, the secondary consequences are becoming more apparent. Muscle wasting in critical illness can be rapid, reaching up to 15% within seven days;[1] this can dictate recovery time frames and lead to long-term disability. Hence, there is an increasing focus on optimising recovery from critical illness. This led to the development of the NICE guidance for *Rehabilitation after Critical Illness* (2009),[2] which recommends a cycle of clinical assessments, implementation of problem-orientated treatment plans and patient agreed goals. However, despite the publication of these guidelines, and numerous studies suggesting that early rehabilitation is safe, uptake of these guidelines is patchy at best[3,4]; and without data to contend otherwise, there are likely to be inconsistencies in the current UK rehabilitation practices. Without a good understanding of service provision, barriers to rehabilitation and clearly defined 'usual care', comparison of functional outcome from rehabilitation trials is difficult, as the 'treatment dose' of the rehabilitation intervention is unclear.[5] Hence, benchmarking current intensive care unit (ICU) physiotherapy practice throughout the UK will provide valuable insight into UK service provision, guide methodological considerations for future interventional studies and, importantly, help clinicians to identify movable barriers to implementation of therapy.

In this issue of *JICS*, Knott et al.[6] set out to benchmark their current ICU rehabilitation practices and identify barriers to active rehabilitation. Data were collected for a six-week period for patients admitted for over 48 h, in a nine bedded general ICU. Time to active rehabilitation, the type of rehabilitation administered and the barriers to active rehabilitation were recorded. Active rehabilitation included active assisted exercises, dynamic sitting practice, sit to stand, standing practice, transfers and walking.

The authors recorded data for 33 patients equating to 195 treatment sessions. Results showed that active rehabilitation was included in 49% of therapy sessions. The median (IQR (range)) time to commence active rehabilitation was 3 (3–7 (3–42)) days. The most commonly encountered barriers, which accounted for 70% of the total barriers, were the presence of an endotracheal tube (ETT) (21%), sedation (29%), an open abdomen (11%) and physiological instability (9%); other barriers included equipment, staffing, pain, fatigue and agitation.

The authors conclude that the presence of an ETT and sedation use were the key barriers to participation in active rehabilitation. They acknowledge that the presence of an ETT and sedation may reflect severity of illness; with a mean number of days to tracheostomy being 15 at their centre, they hypothesise that earlier tracheostomy may have expedited initiation of active rehabilitation and resulted in less sedation use. Patients being too unstable or unwell were also found to be a common 'barrier' to active rehabilitation.

Publication of ICU rehabilitation service evaluation data such as this is vital in understanding our current UK practice; without understanding our 'usual care', it is hard to identify barriers and make improvements. As such, this simple and inexpensive methodology could, and should, form a useful framework for others to adopt.

As service provision is variable, benchmarking and quantifying activity, as well as identifying barriers to early activity is essential in order to overcome them.

However, an important consideration is the definition of 'barrier'. A barrier implies an obstacle: something that is getting in the way, something that could be moved or changed to allow the activity to occur. In the context of early mobility in critical care, it implies a patient that *could* engage in rehabilitation, but something is stopping them. However, sometimes this is not the case. Some critically ill patients are just too sick to rehabilitate; this is not something that we as health care professionals can necessarily change or influence. In this instance, should this 'barrier' in fact be considered a contraindication?

This may seem a pedantic debate of nomenclature; however, as a strong advocate for early mobilisation, this author believes that it is an important discrimination to make. If we consider contraindications to be barriers, we are making the assumption that early mobilisation is *always indicated* and *always safe*. This is simply not the case. Although many research studies have been carried out that indicate that early activity is safe, all of these studies have strict exclusion criteria, such as cardiorespiratory instability,[7] haemodynamic instability,[8] raised intracranial pressure,[9] etc. If we bracket barriers together with contraindications, we run the risk of setting ourselves unrealistic targets

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for early mobilisation and, importantly, we lose focus on those true 'barriers' that we can influence. It may be that the clinical decision-making around 'stability' of the patient is variable from between clinicians of different experience and centres, but then this becomes an issue of education and clinical competence, which should be considered the true 'barrier' to mobilisation.

To elaborate on this point, Pohlman et al.[9] completed a study into the safety and feasibility of early physical and occupational therapy beginning from the initiation of mechanical ventilation during daily sedation holds. Prior to initiating therapy, they did a 'safety screen' against a pre-determined list of 'contra-indications', which included assessment for: cardiovascular instability (mean arterial pressure below 65), respiratory instability ($SpO_2 < 88\%$), agitation, neurological instability (e.g. raised intracranial pressure), and if the patient was undergoing an active procedure. In 72 of the possible 570 therapy sessions (12.6%), patients were 'screened out' for safety reasons due to one of the above criteria. When therapy did occur, minor adverse events (e.g. heart rate above 130 bpm, or drop in SpO_2 of $\geqslant 5\%$) were reported in 80 out of a total of 498 therapy sessions (16%); however, only in 4% (19) of sessions was therapy terminated early. The authors contest that these minor adverse events represent a physiological response to exercise. The authors also anticipated a number of 'barriers' to initiation of early activity determined a priori, which included 'cardiovascular problems' and 'respiratory problems' (e.g. acute lung injury), amongst other things.

From the results, Pohlman et al. conclude that early activity is safe, and that the pre-determined barriers did not preclude therapy, as some 'barriers' were present during therapy sessions. For example, in 35% of therapy sessions the patients had an FiO_2 of above 0.6. Importantly, these results were obtained in the patients that passed the 'safety screen', the contents of which overlap significantly with the pre-determined 'barriers'. This leads to confusion in the clinical application of these results. When do 'respiratory problems' take the leap from barrier to contraindication, and should instability be considered a barrier at all when it cannot be changed, is it in fact a brick wall?

Pohlman et al.'s study is a very well-constructed, novel and important trial, supporting the safety of early activity *in stable patients*; however, this study does help to elucidate the need for clarity in defining 'barriers' when reporting on both benchmarking and safety of therapy intervention in critical care.

Knott et al. report that 'active rehabilitation' was included in 49% of all physiotherapy sessions; however, as we do not know how many of these sessions could have involved (but didn't) active rehabilitation, the true number is difficult to interpret. Comparison against a 'safety screen' in this study would be useful.

Knott et al. also suggest that the use of ETTs and sedation were barriers to rehabilitation. However, one has to question whether, in isolation, these are truly a barrier or simply indicative of an unstable patient? Without acuity data, it is difficult to make that judgment; hence, caution should be taken when implying a causal relationship. As suggested by the authors, future benchmarking studies would benefit from sequential organ failure assessment scores to assist in identifying whether the ETT or sedation truly are the barriers, or whether they are merely the physical manifestation of a patient that is too unwell to engage in rehabilitation.

The study in this issue by Knott et al. highlights an important issue of benchmarking rehabilitation provision across the UK, as well as the importance of identifying barriers to early mobilisation in critical care. The authors have provided a pragmatic evaluative framework that could be adopted for widespread use and provide valuable data to describe 'usual care'; this framework would be strengthened by the inclusion of acuity of illness data.

Future work should also focus on identifying true barriers to rehabilitation and separating those out from contraindications. This will allow clinicians to set realistic benchmarking targets and clearly identify where service improvements can be made. If these movable barriers and hurdles can be identified, it will save us from hitting our head against the metaphorical brick wall!

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