Netherlands
The Journal of Medicine

EDITORIAL

Hospital volume determines favourable outcome: probably also in internal medicine

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The very rapid development in molecular genetics and biotechnology, imaging technology, detailed insights into intricate mechanisms such as immunology, host defence, metabolism, tissue differentiation and cell regulation, and a host of new invasive and non-invasive techniques have resulted in revolutionary changes in medicine in the current era. Diagnostic management, therapeutic options, and preventive strategies are developing at a breath-holding pace while few physicians who practise day-to-day medicine seem to realise they are part of a highly exciting time in medicine, which is unparalleled by any other era in the preceding centuries. As these developments occur, in some situations medicine is getting increasingly complex, requiring highly specific and multifaceted infrastructure and demanding skills of medical and paramedical professionals. One of the responses of medical professionals is subspecialisation, which is not only widely present in internal medicine, but in virtually all medical specialisms.[1]

As the complexity of medicine increases, some specialities have come to the realisation that the outcome of medical treatment may be dependent on the number of patients that are treated within a given time interval. This association was hypothesised as early as in 1979 by Luft.[2] In recent years a large number of studies have been published demonstrating a clear relationship between hospital volume and clinically relevant outcome parameters, including survival. Initially, these studies were mainly done in surgical patients undergoing complex procedures, such as oesophageal resection, pancreaticoduodenectomy, or coronary artery bypass surgery.[3,4] However, similar associations have been demonstrated for complex urological procedures, such as cystectomy, and gynaecological oncology, including hysterectomy for uterine or cervical cancer.[5,6] Most of these studies show a near linear relationship between hospital volume and outcome and virtually all studies demonstrate a threshold below which the rate of complications and an unfavourable outcome steeply increases. As the awareness of the association between a minimal number of procedures and a favourable outcome of surgery increases, surgical societies have proposed a minimum of procedures as a quality indicator and in some situations regulatory bodies have adopted these minimum numbers. Interestingly, implementation of these minimum hospital volumes in the US or Canada has resulted in improving the outcome for major procedures.[7,8] In the Netherlands a similar trend has been demonstrated for major gastrointestinal oncological procedures.[9] For a long time it was assumed that the underlying mechanism that determines the relationship between hospital volume and patient outcome was the (surgical) skills of the doctor. However, it is becoming increasingly clear that other factors are at least as important and are doctor-independent. These factors include set up and organisation of preoperative and postoperative care and intensive care departments, experience of imaging and laboratory personnel, knowledge and skills of nurses and other paramedical disciplines, and familiarity of the entire institution with particularly complex patient groups, which for example determines the ability to quickly recognise complications at an early stage and act adequately in these situations.

However, if the relationship between hospital volume and patient outcome does not entirely depend on the skill of the operator, it may be hypothesised that a similar relationship may exist for complex non-surgical diagnoses. Indeed, some initial studies have shown such associations for the management of acute myocardial infarction, stroke, and even for common medical diagnoses including pulmonary embolism and peptic ulcer treatment.[10-13] Obviously, it is questionable whether these associations are universally translatable to other medical settings, for example in countries with a high level of medical care such as in the Netherlands. On the other hand, it is quite surprising that for medical specialities there is hardly any discussion on hospital volume as a determinant of patient outcome or even minimum volumes to achieve an acceptable outcome. While in surgical specialities there is intense debate on

this issue, it is awkwardly silent in societies of medical specialities in Europe and other parts of the Western world. However, it may safely be assumed that for many serious and highly complex, low-volume conditions in internal medicine a minimum volume of patients per year is required to achieve optimal patient outcome. Can we go on to treat severe antiphospholipid syndrome, Graves ophthalmopathy, acute renal failure, advanced chronic lymphatic leukaemia, hypertensive crises, Wegener's granulomatosis, chest syndrome in sickle cell disease, or cryptococcal meningitis in virtually all hospitals, even if the medical and paramedical staff are very rarely or hardly ever confronted with these problems and do not really know how precisely to handle these conditions and their associated complications?[14-18] Should we at least start some clinical studies to determine whether the care of patients with these conditions is up-to-date and achieves equal outcomes in (very) low-volume hospitals versus hospitals that see these patients on a more regular basis? It may be about time internal medicine and other medical specialities wake up and take the example of surgical colleagues and societies and start to think about adequate hospital volume as a determinant of patient outcome in low-volume complex medical disorders. Based on the results of these surveys it may well be that doctors need to suppress their (understandable) professional pride and face the reality that some patients may be better off in another clinical setting than under their care. And that has nothing to do with the individual knowledge and skills of doctors but merely depends on the clinical setting in which they work.

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