

# The art of autopsy – time for a renaissance

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The overwhelming majority of people now die in old age. From a medical perspective the end of life is paved with comorbid conditions that over decades of time have led to multiple organ damage and failure of complex systems. Clinicians who are responsible for (old) patients are in need of detailed information on the structural status and remaining function of the failing body to guide their therapies. In this issue of the Journal, colleagues from the Department of Geriatric Medicine in Nijmegen report on clinical decisions that, often in the absence of sufficient information, appeared disputable when the outcomes of autopsy became available.<sup>1</sup> The authors should be praised for having exposed the outcomes of their professional work to us. This is especially true as the art of autopsy is rapidly fading and this type of comparative study may not be doable in the future. There is no question that for some of their patients the authors would have decided otherwise if the appropriate information had been available during life. Hence, it is critical to understand why doctors often lack this crucial information on structure and function of the failing body to guide their clinical decisions. And, why are we not bothered by such ignorance?

Nowadays, imaging techniques such as computerised tomography (CT) and magnetic resonance imaging (MRI) can easily be applied during life and seem to have made the pathological examinations after death unnecessary. Structural data from CT and MRI can also be combined with functional studies and it is suggested that with this combination in hand clinicians have all the critical information for decision-making. And, without doubt, this is far more valuable than having this information after death. But quite often in the old, in whom virtually all organs are damaged and only patchy structural and functional information is available, we do not fully understand the complex interactions that are at play. Might it be that in some of our patients our inference is false? Shouldn't there be a regular check whether we were correct in our reasoning, as a kind of quality control? And what if whole body scanning and total function testing becomes undoable in frail and diseased

elderly? A situation that is even more complicated when patients are critically ill, bound to a ventilator and have a pacemaker implanted.

Access to CT and MRI has had a groundbreaking impact on the diagnostic abilities of clinical medicine and it is therefore not surprising that both inventions have led to a Nobel Prize. The techniques were both pioneered on the brain. The size of the skull and the fact that brains do not move makes the head a perfect body structure to start with. But perhaps this choice can also be explained because the brain was one of the latest 'untouchable' organs, at least during life. This frustrating ignorance of what was going on in the brain is most likely not different from the feeling that in ancient time has led to performing autopsies. Did the earliest dissections serve to reveal the secret of life? Without doubt Michelangelo must have used autopsy to better paint and sculpture his figures. Anatomy and physiology could only flourish by dissections performed by masters as Versalius and Harvey. All of this now seems history, but it is essential to realise that nowadays techniques as CT and MRI have not replaced the pathological examination of the brain. It has only recently been shown that a large proportion of old people without cognitive impairment and normal CT and MRI of the brain have significant Alzheimer pathology at autopsy. The modern techniques have missed this critical observation and are as yet unable to reveal this type of structural damage. And how should we interpret the white matter hyperintensities on MRI that are so closely associated with Alzheimer dementia and depression? The underlying pathology has still not been fully determined, as combined studies of MRI and pathology are so scarce. The modern techniques show us far more abnormalities than we are currently able to interpret.

The ageing body is filled with yet unresolved mysteries. The structural and functional basis of the failing heart and kidney in old age is largely unknown. Why is it that osteoporosis of the radius does not synchronise with osteoporosis of the back? Some parts of the body could better be described as unknown territories. Muscles have hardly been explored

in old age and muscle weakness has not even been given a name other than 'normal ageing'. Poor muscle strength can in part explain why people fall, suffer from hip fractures, or develop respiratory insufficiency. There is emerging evidence that muscles of older people are deficient of 'pericytes', organ-specific stem cells that are necessary for the repair of damaged tissue. Specific expression of proinflammatory cytokines may contribute to muscle weakness in animal models but there are hardly any data in man to support such a malleable biological mechanism.

Let our ignorance of disease in old age serve as a catalyst for the renaissance of autopsy.

#### REFERENCE

1. Aalten CM, Samson MM, Jansen PAF. Diagnostic errors in geriatric medicine; why we should continue to have autopsies. *Neth J Med* 2006;64(6):186-90.

