Ageing today and tomorrow

How should clinical care of the aged differ?

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Of all the people who have ever lived to age 65, more than half are currently alive. Although the incidence of many diseases increases with age, for the clinician the significance of such statistics stems from the fact that care of older patients so often differs from that of younger people.

From a physiological standpoint ageing is best characterised as progressive constriction of each organ system’s capacity to maintain homeostasis in the face of challenge. This gradual decline in physiological reserve (or “homeostenosis”) begins in the third decade and occurs in each organ system independently of changes in other organ systems and is influenced by diet, environment, and personal habits as well as by genetic factors. From this concept it follows that individuals become more dissimilar as they age, belying any stereotype of age; that an abrupt decline in any system or function is always due to disease rather than “normal ageing”; that “normal ageing” can be attenuated by modification of risk factors such as increased blood pressure, smoking, and sedentary lifestyle; and that “healthy old age” is not a paradox for, in the absence of disease, homeostenosis results in neither symptoms nor restrictions in activities of daily living at any age. These deceptively simple ideas have important implications for care, research, education, and health policy. We will focus on the clinical implications, summarised as six principles of care for the elderly.

Because of impaired physiological reserve in older patients, disease often presents at an earlier stage. At any age, symptoms reflect an imbalance between disease severity and intrinsic compensatory mechanisms (figure 1). Since these mechanisms are generally intact in younger individuals, disease can progress further before causing symptoms. In older patients compensatory mechanisms may be impaired by pre-existing disease or by physiological decline and even mild disease may tip the balance—eg, heart failure may be precipitated by mild hyperthyroidism, significant cognitive dysfunction by mild hypercalcaemia, urinary retention by mild prostatic enlargement, and nonketotic hyperosmolar coma by mild glucose intolerance. Thus treatment of the underlying disease may be easier. An old person with hypercalcaemia-induced cognitive dysfunction often needs a drug, not parathyroidectomy, those with hyperosmolar coma do not usually need chronic insulin, patients with urinary retention often do not require prostatectomy, and congestive heart failure often can be managed by diet or thiazides rather than potent diuretics.

An important corollary is that side-effects can occur with drugs and doses unlikely to be toxic in younger people. An antihistamine may cause confusion, thiazides may precipitate urinary incontinence, digoxin may induce depression (even with normal serum levels), and over-the-counter sympathomimetic agents may precipitate urinary retention.

Unfortunately, the predisposition to develop symptoms earlier, when disease is more treatable, is often offset by changes in illness behaviour. Brought up at a time when symptoms and debility were accepted as normal consequences of ageing, today’s elderly are less likely to seek help for dysfunction and thus present at more advanced stages of disease. For instance, although breast cancer in older women is more likely to be rich in oestrogen receptors and therefore less aggressive, older women remain more likely to die of breast cancer than with it. This sad situation results from less widespread screening, delays in presentation, and less aggressive resection, radiotherapy, and chemotherapy, even though elderly women who are eligible for treatment protocols do as well as younger ones.

Further off-setting the potential benefits of symptoms developing earlier is the difficulty of diagnosis, because of the next three principles.

Presentation of a new disease depends on the organ system made most vulnerable by previous changes, and, because the most vulnerable organ system (“weakest link”) often differs from the one newly diseased, presentation is often atypical. Because the “weakest link” is so often the brain, lower urinary tract, or musculoskeletal or cardiovascular system the presenting symptoms tend to be acute confusion, depression, incontinence, falling, and fainting—no matter what the new disease. For instance, less than one in four older patients with hyperthyroidism present with the classic triad of goitre, tremor, and exophthalmos; more likely are atrial fibrillation, confusion, depression, syncope, and weakness. Similarly, acute confusion or even falling are often the initial presentations of appendicitis, pneumonia, and urosepsis in older patients. As a result, the differential diagnosis is largely the same, regardless of the symptom—and dysfunction of the organ system usually associated with a symptom may not be the cause of the problem. In an old person acute confusion is less often due to a new brain lesion, depression to a psychiatric disorder, incontinence to bladder dysfunction, falling to neuropathy, or syncope to heart disease than they are in middle-aged patients.

Many findings that are abnormal in younger patients are common in older people and may not be responsible for a particular symptom.
Such findings include bacteriuria, premature ventricular contractions, low bone-mineral density, impaired glucose tolerance, and involuntary bladder contractions. These "abnormalities" can result in missed diagnoses and misdirected therapy. For instance, a finding of bacteriuria should not end the search for the source of fever, nor should a raised random blood sugar be incriminated as the cause of neuropathy. Patients with syncope due to medications and dehydration, but whose cardiac monitors reveal ventricular ectopy, may be harmed by misdirected antiarrhythmic therapy. However, other abnormalities must not be ascribed simply to age—eg, there is no such thing as anaemia, impotence, depression, or confusion of "old age".

Because comorbid disease and drug use are common in older people, symptoms are often due to multiple causes

Fever, anaemia, retinal embolus, and a heart murmur prompt almost a reflex diagnosis of endocarditis in a younger patient but are more likely to reflect aspirin-induced blood loss, cholesterol embolus, insignificant aortic sclerosis, or a viral illness in an older patient. The cause of syncope in up to half of older patients admitted to acute hospitals is still undetermined at the time of discharge despite expensive evaluations targeted at a single cause. Attention to common, multifactorial aetiologies may result in less expensive testing and higher diagnostic yield. With dizziness, hip fracture, incontinence, delirium, and falls too, a search for "the" cause is often misdirected.

Even when the diagnosis is correct, treatment of a single disorder often does not result in cure. In a younger patient, incontinence due to involuntary bladder contractions responds to a bladder relaxant. An older patient will not benefit from such a drug if she also has a faecal impaction, takes medications that induce confusion, and has impaired mobility due to arthritis. Disimpaction, discontinuing the offending medications, and treating the arthritis are more likely to restore continence in her case and may obviate the need for a bladder relaxant.

Because many homoeostatic mechanisms are often compromised concurrently, there are usually multiple abnormalities amenable to treatment, and small improvements in each may yield dramatic benefits overall

This principle also follows from figure 1 but focuses on impaired compensatory mechanisms rather than disease severity. For instance, cognitive impairment in Alzheimer's disease is often exacerbated by poor hearing and vision, depression, heart failure, thyroid dysfunction, and electrolyte imbalance (figure 2). Falls associated with neuropathy are exacerbated by concomitant drug use, arthritis, and orthostatic hypotension. Substantial improvement can result from treating the contributing factors even if, as in Alzheimer's disease or neuropathy, the underlying condition cannot be treated.

Because older patients are more likely than younger ones to suffer adverse consequences of disease, treatment (and even prevention) may be equally or even more effective

The survival benefits of exercise, as well as thrombolysis and beta-blocker therapy after a myocardial infarction, are as impressive in older patients as in younger ones.

References
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Figure 2: Contributions to loss of mental status in Alzheimer's disease
Both young and old patients may appear to suffer equally from Alzheimer's disease, but its extent in older patients is often magnified by comorbidity and drug use. Identification and treatment of these contributing factors will improve the older patient's function even though the Alzheimer's disease is untreatable.

Treatment of hypertension and transient ischaemic attacks and immunisation against influenza and pneumococcal pneumonia are even more effective in older patients. However, prevention must often be seen in a broader context. Increasing bone density may be difficult in older patients but fracture can be prevented by interventions that reduce falls—eg, by addressing balance, peripheral oedema, nocturia, urinary urgency, and nutritional deficits, by removing environmental hazards, and by modifying medications that induce parkinsonian stiffness, orthostatic hypotension, or confusion.

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