

Obesity in the elderly patient

Obesity has increased dramatically in the UK because of the ageing population alongside the general secular trend for weight gain across all age groups. Obesity exacerbates all the complications of old age and has a great impact on people's lives and their ability to function and exist independently. Managing obesity in the elderly, in the context of concurrent and associated long-term conditions is important and realistic as a means of improving health, reducing risk and enhancing quality of life.

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Obesity is present in a quarter of the adult population. The number of normal weight individuals is actually reducing while the number of obese and morbidly obese people is increasing rapidly. Obese individuals are more frequent users of clinical services than their non-obese counterparts, and consume larger quantities of pharmacological agents than their peers, using a disproportionate amount of clinicians' time.

The main tool used in identifying obesity is simple observation. The obese abdomen is an obvious clinical sign of underlying pathology and measurements merely confirm the initial impression. No simple method of quantifying obesity is foolproof, but waist circumference and BMI are the best. Abdominal rather than peripheral fat is the sinister type, although it may only act as a marker for alternative visceral reservoirs such as epicardial or pancreatic fat deposits. Evidence from human studies suggests that lipid accumulation in the heart, skeletal muscle, pancreas, liver, and kidney play an important role in the pathogenesis of heart failure, obesity and diabetes. Excess free fatty acids may impair normal cell signalling, causing cellular dysfunction and cell death.¹ In addition, obesity is a condition characterised by "low-grade" chronic inflammation mediated by a strong increase in circulating levels of proinflammatory cytokines, hormone-like molecules and other inflammatory markers, collectively termed "adipokines"² that underpin the wide range of associated morbid conditions.

Prevalence of obesity

A quarter of adults are obese, and almost two thirds are above the threshold for overweight in the UK. Obesity rates increase with age up to the age of 70 years, and

decline thereafter.³

Obesity also decreases life expectancy by seven years in a 40 year old: the increase in risk of death with each unit increase in BMI declines progressively with age but remains substantial until the age-group of 75 years and older.⁴ Measured by BMI, obesity now affects around one in three men and women over the age of 45 years. The Government's Foresight report⁵ highlighted childhood obesity as a looming problem in our obesogenic society, predicting a dire future society filled with young adults who are incapacitated and disease ridden due to obesity. The newspapers sensationalise obesity on a daily basis either sympathising with or condemning "victims" of the condition.

Obesity and ageing

Changes in metabolism with increasing age is a normal process; the fat to muscle mass ratio alters so there is less metabolically active tissue available. Appetite suppression often accompanies this so that the elderly tend to do less as they consume fewer calories. However a variety of alterations in the societal and physiological environment can destroy this delicate balance. The availability of cheap, low quality and high calorie food plays a part as many old people are living on or near the poverty line and will simply fill up on high carbohydrate high fat meals.

Type-2 diabetes

Levels of type-2 diabetes are also rising. People diagnosed with diabetes in their 40s who are now aged 75 years will have had diabetes for 35 years. This precocious development and prolonged duration of diabetes presents unique challenges given the necessity for long-term use

of classes of drugs that are known to have side-effects.⁵ In the past it was normal to diagnose and treat diabetes in the seventh or eighth decade therefore managing elderly patients in their final years did not require a long-term view of implications. However, identifying effective management strategies for a newly diagnosed 30 year old patient, who may require increasingly complex drug treatments maintained over 30 to 40 years presents a different challenge.

The longer the duration of diabetes, the more problems it can cause. Patients who have been on a sulphonylurea for the past 20 years or so years could be gaining little from their long-term use while suffering β -cell failure, weight gain and dangerous hypoglycaemic attacks. Many will also have a rising HbA1c, which is not being addressed. Insulin therapies are also problematic in the elderly for many reasons including weight gain and delivery device difficulties. Primary care targets for HbA1c currently stand at 7% but new evidence coming to light shows that there is an increased mortality associated with HbA1c $<7.5\%$ in those on insulin or insulin secretagogues.⁶ NICE stresses that treatment should be bespoke, and certainly elderly patients should have carefully set HbA1c targets with all due consideration given to their age and duration of diabetes. Chronic enduring hypoglycaemia is a particular problem in the elderly, and the combination of high doses of insulin or sulphonylureas may lead to the elderly person consuming more carbohydrate snacks than is necessary in order to lift the blood sugar.

Obesity-related comorbidities

There is a growing body of evidence that links obesity to inflammation, stress, vascular disease and even cognitive decline.⁷ Morbidities such as hypertension, diabetes, hyperlipidaemia, glucose intolerance frequently co-exist in an ageing population and together they constitute the metabolic syndrome. The elderly tend to lead more sedentary lifestyles and this can contribute to a higher waist: hip ratio, which may be related to vascular, degenerative metabolic processes. These processes may affect brain structures, which underlie cognitive decline and Alzheimer's disease.⁷ Midlife obesity is a risk factor for dementia but paradoxically after the age of 65 years, underweight individuals are at higher risk and obesity is protective. Individuals with a midlife BMI of >30 are more likely than those of a normal weight to develop dementia, while those with a BMI <20 in later life have an increased

risk of dementia whereas overweight individuals did not, and obesity provides protection.⁸

The association between BMI and dementia is thought to be due to the combination of effects of excess adiposity on blood pressure, lipids, carotid-artery-wall thickening, vascular and coronary endothelial dysfunction, peripheral resistance, arterial stiffness, ventricular hypertrophy, increased sympathetic activity, increased intravascular volume, high cardiac output, and increased platelet aggregation.⁹

Other obesity-related conditions include sleep apnoea, compounded by an increased neck girth, and thromboembolic disease. Adipose tissue acts as an endocrine organ in its own right,¹⁰ in the regulation of fat metabolism, carbohydrate ingestion and appetite. Obesity represents dysfunction of the organ leading to a subclinical chronic inflammatory state.¹¹

Arthritis is the most common reason for physical disability, with knee and hip arthritis being the most prevalent cause of infirmity. Obesity may precede the development of arthritis by several decades – chronic mechanical strain on weight-bearing joints begin to appear from about the age of 40 or 50 years and often by the age of 65 years, simply accomplishing normal everyday tasks becomes an insurmountable burden.

Not only is chronic disease increased, there is an increase in several more common malignancies such as prostate, uterus, colon and breast cancer.¹² Malignancy is one of many morbidities that increase in both the elderly and the obese patient. Visual impairment in old age causes problems in about 20% of those over age 65 years.¹⁰ Overweight and obesity can significantly increase this process – it is unclear, however, whether the cataracts are caused by increased circulatory inflammatory mediators or other causes. Other problems that are already prevalent in old age are urinary incontinence with 15–30% of patients over 65 years being affected, and this is increased in those with obesity, partly due to problems with immobility and struggling to get to any toilet facilities in time.

Sarcopenia

The effect of ageing on body composition is that of a progressive loss of strength and power due to a reduction in muscle mass, known as sarcopenia. Important changes in muscle composition occur such as "marbling", or fat infiltration into muscle, lowering muscle quality and work performance.¹³ Sarcopenia contributes to frailty

in the elderly, leading to a loss of independence and further social exclusion and sarcopenic obesity is the confluence of these two epidemics.¹⁴ Sarcopenia seems to act synergistically with obesity to maximise disability and, together with the deleterious effects of dementia on an ageing society, there are profoundly negative health consequences for our ageing society. The presence of sarcopenia increases rapidly after 65 years and is associated with both physical disability and functional limitation.

Nutrition and exercise

The higher an older person's BMI, the more likely they are to develop mobility problems and to experience problems with carrying out everyday tasks. This increase in chronic disability can then create difficulties in making changes. Many older people find themselves becoming more dependent on others and circumstantial changes such as widowhood, institutionalisation and loneliness may well need to be addressed before any changes can be made. Depression is a significant factor in the aetiology of sarcopenia and obesity. It can be treated both with alternative therapies, group therapy, counselling and pharmacology. In order to be treated, depression must be recognised and it may often mask itself as irritability, confusion or even neglect. Screening for depression is carried out in primary care, using the PHQ9 or HAD depression score, in those who have diabetes and chronic heart disease but at present not in those who have obesity or who are over 65 years.

Body composition

Mean body weight and BMI gradually increase during adult life until the age of 50 to 60 years,¹⁵ and maximal fat mass is generally reached by this age.¹³ In general, weight continues to increase until these decades when there is a stabilisation of weight and then even a tendency to lose weight. Obese elderly adults will tend to die prematurely, partly explained by the fact that at any given weight, older adults have substantially more body fat than young adults. The decreased physical activity level and increase in body fat lead to reduced resting basal metabolic rate, declining sex hormones, reduced growth hormone secretion and the reduced thermogenic effect of food. Not only do older obese adults have more body fat, but the fat is distributed differently. Insulin resistance is

heightened by the greater proportion of intra-abdominal and intra-hepatic adiposity than subcutaneous fat. These physical changes cause adverse metabolic outcomes, including increased diabetes mellitus and cardiovascular disease.

It is not all bad news though; in fact increased adipose tissue in the elderly may give a cushioning effect to the skeleton due to the increased bone mineral density and decreased osteoporosis and hip fracture.¹³ This may also be due to hormonal factors at play. Theories are being advanced that leptin, circulating oestrogens and even insulin could have protective effects; one study found that a 1-standard deviation decrease in fat mass was associated with as much as a 30% increase in the risk of hip fracture. So encouraging older people to lose weight to increase their life expectancy may not actually be the right advice and our hospitals could end up with an increasing number of elderly, granted less obese elderly, with prolonged lengths of stay in an immobilised state and an increased osteoporotic fracture risk.

The obesity paradox

Yet there is a paradox in all this. When obese people develop vascular disease they in fact have better outcomes than their "normal" weight counterparts.¹² It is proposed that this may be due to a greater metabolic reserve and the reduced activation of the sympathetic nervous system. This effect is also not seen in the severely obese who seem to be more at risk. In nursing home residents, obesity is associated with increased survival and stable functionality,¹⁶ although this may simply reflect a population of "survivors" of obesity who have avoided the premature death to which their higher risk counterparts succumbed.

Some solutions

While it is generally recommended that all those with a BMI over 25 should try to lose weight, caution should be exercised when recommending weight loss to the elderly on the basis of body weight alone.¹² Weight loss methods must be combined with a programme to increase or at least preserve muscle mass in order not to accelerate sarcopenia and its resulting increase in comorbidities. Some also advocate encouraging a "weight constancy" approach instead of condemning an older person who appears to be unable to lose as little as 5% of their body

weight, this approach can be seen to be particularly effective in primary care where care can be invested in helping patients with their long-term outcomes.¹⁷

Bariatric surgery

Surgery in the obese is always more complicated, not only because of the physical complications such as access to the internal organs through the extra adipose tissue, but also respiratory complications during surgery where the sheer bulk of the patients can compromise the perioperative morbidity and mortality. Yet bariatric surgery can result in considerable weight loss as well as a marked improvement in diabetes and a lessening of physical dysfunction. Villareal suggests that the laparoscopic-adjustable gastric band may be more suitable for older patients due to its association with fewer serious side effects. This treatment is recommended for those older obese patients who have a disabling obesity.¹⁰

Pharmacotherapy

There is currently only one drug available with which to treat obesity – Orlistat 12 mg tds, (Xenical) or over the counter as a half dose of 60 mg (known as ALLI) for which patients must pay. Problems can arise in the elderly with an increase in the side effect profile and also the polypharmacy with which patients often struggle, needing ever more complex regimes for their comorbidities such as diabetes, cardiovascular disease and hypertension.

Conclusion

Obesity in the elderly is a complex disease that is becoming increasingly common in today's ageing, inactive society. There are treatments available which can be delivered in a variety of settings but these treatments must be delivered in a sensitive, bespoke fashion, which is carefully tailored to meet both the needs of individuals and also begin to address this problem that will be an enormous increasing burden on the healthcare economy if we do not recognise the individual and societal implications.

Conflict of interest: none declared

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