Obesity

OSA, obesity and metabolic dysregulation: Growing links

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Obstructive sleep apnoea (OSA) is a common condition among obese people and has been associated with poor cognitive function, hypertension, and increased cardiovascular risk (Young et al, 2005). The condition is increasingly being recognised among people with type 2 diabetes (Punjabi et al, 2004).

OSA is characterised by partial or total obstruction of the upper airway during sleep resulting in reduced airflow (hypopnoea) or no airflow (apnoea), respectively, despite respiratory effort. Reduced airflow results in hypoxaemia and arousals that are unperceived by the person with the condition, but frequently leave them reporting daytime sleepiness; other symptoms include gastro-oesophageal reflux, headaches, sexual dysfunction, and depression. The treatment of choice for OSA is continuous positive airway pressure (CPAP), which provides a pneumatic splint for the upper airway during expiration.

Gasa and colleagues (2011; summarised alongside) examined the prevalence of OSA in an obese population referred for bariatric surgery, and sought to determine the relationship between OSA and metabolic parameters. Although this was a small study, it adds to the increasing body of evidence linking OSA to metabolic dysregulation (Coughlin et al, 2004; Punjabi et al, 2004), and there are several findings important to clinical practice.

The prevalence of moderate to severe OSA (apnoea–hypopnoea index ≥15/hour) in the study population was high (72%); only 2% had no OSA. The majority of participants with OSA did not complain of sleepiness as measured by the Epworth Sleepiness Scale, which asks about the chances of going to sleep in various situations, such as in front of the TV. A similar lack of reporting of sleepiness is seen in people with diabetes who have OSA (West et al, 2007). These findings are important because, unless people with obesity and diabetes are specifically screened, there is a high likelihood of missing the OSA diagnosis in this population.

Gasa et al also reinforce the association between OSA and metabolic abnormalities. There are now several studies from different populations supporting a relationship between OSA and glucose metabolism. The majority of studies show that increased severity of OSA is associated with the metabolic syndrome and glucose intolerance (Coughlin et al, 2004; Punjabi et al, 2004); although, it is difficult to examine the effects of OSA on glucose metabolism independent of visceral adiposity. Given these findings, it would be expected that CPAP treatment would be beneficial to diabetes control and other metabolic abnormalities. Unfortunately, mixed results on glucose metabolism and diabetes control have been observed with CPAP treatment (West et al, 2007). However, various problems with study design may be involved.

There are several mechanisms that could mediate the interaction between OSA and metabolism. These include intermittent hypoxia, increased sympathetic nervous system activation, nighttime sleep loss, daytime napping (Lam et al, 2010), and alterations in metabolic hormones (Taheri, 2007). Further research is necessary to examine the role of OSA in metabolic and cardiovascular function. In the mean time – and in the clinic – it is important to appreciate the high prevalence of OSA among people with obesity and diabetes, and its impact on general health and quality of life.

Coughlin SR, Mawdsley L, Mugarza JA et al (2004) Obstructive sleep apnoea is independently associated with an increased prevalence of metabolic syndrome. *Eur Heart J* **25**: 735–41

Lam KB, Jiang CQ, Thomas GN et al (2010) Napping is associated with increased risk of type 2 diabetes: the Guangzhou Biobank Cohort Study. *Sleep* **33**: 402–7

Punjabi NM, Shahar E, Redline S et al (2004) Sleep-disordered breathing, glucosemintolerance, and insulin resistance: the Sleep Heart Health Study. *Am J Epidemiol* **160**: 521–30

Taheri S (2007) Sleep and metabolism: bringing pieces of the jigsaw together. *Sleep Med Rev* **11**: 159–62

West SD, Nicoll DJ, Wallace TM et al (2007) Effect of CPAP on insulin resistance and HbA_{1c} in men with obstructive sleep apnoea and type 2 diabetes. *Thorax* **62**: 969–74

Young T, Peppard PE, Taheri S (2005) Excess weight and sleep-disordered breathing. *J Appl Physiol* **99**: 1592–9

EUROPEAN RESPIRATORY JOURNAL

OSA associated with major metabolic impairment in obese people

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓✓✓

1 Obstructive sleep apnoea (OSA) is associated with obesity and poor metabolic control. The authors hypothesised that metabolic profile is more impaired in morbidly obese people who have OSA, than in those without OSA.

2 In a prospective, multicentre, cross-sectional study, consecutive morbidly obese people (BMI ≥40 kg/m^2 or BMI ≥35 kg/m^2 plus ≥one obesity-related comorbidity) who were to undergo bariatric surgery, with or without OSA (apnoea–hypopnoea index [AHI] ≥15/hour), were enrolled.

3 The cohort (n=159) was mostly female (72%), the mean age was 43±10 years, the mean BMI was 46.1±5.8 kg/m^2 and 72% of participants had OSA.

4 Prevalence of the metabolic syndrome was 70% in those with OSA, and 36% in those without (P<0.001); comorbidities (i.e. hypertension and T2D) were more common among those with OSA than those without OSA (24% vs 11%; P<0.057).

5 OSA significantly increased the adjusted odds ratio of a positive diagnosis of metabolic syndrome by 2.8 (95% confidence interval, 1.3–6.2: P<0.009).

6 Among those with morbid obesity, the authors found OSA to be associated with major metabolic impairment independent of central obesity or T2D.

Gasa M, Salord N, Fortuna AM et al (2011) Obstructive sleep apnoea and metabolic impairment in severe obesity. *Eur Respir J* [Epub ahead of print]

DIABETES CARE

Obesity and ≥two cardiometabolic signs increase risk of PVD and PN

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓✓

1 The authors, noting that peripheral neuropathy (PN) and peripheral vascular disease (PVD) are increasingly recognised in people with diabetes at the time of their diagnosis, hypothesised that PN and PVD may be markers for prediabetes and future disability in the general population.

2 Prevalance of PN and PVD were assessed and the association of obesity and cardiometabolic characteristics (CMC) clustering examined in a population-based sample.

3 People (n=2514) aged ≥40 years from the 2001–2004 US National Health and Nutrition Examination Survey were assessed for CMCs (i.e. elevated triglycerides or plasma glucose, low HDL-cholesterol, increased waist circumference, hypertension) and clustered (≥two CMCs) and combined with BMI to generate three groups: obese (with or without clustering); non-obese (with clustering); and non-obese (without clustering).

4 Nine per cent of the cohort had PN, 8.5% PVD, and 2.4% both. The obese group was more likely to have NP (odds ratio [OR], 2.20; 95% confidence interval, 1.43–3.39), PVD (OR, 3.10; 95% CI, 1.84–5.22), or both (OR, 6.91; 95% CI, 2.64–18.06) compared with non-obese people without clustering.

5 Obesity and ≥two CMCs was found by the authors to markedly increased the likelihood of NP and PVD, identifying a group at risk of future disability and/or diabetes.

Ylitalo KR, Sowers M, Heeringa S (2011) Peripheral vascular disease and peripheral neuropathy in individuals with cardiometabolic clustering and obesity: national health and nutrition examination survey 2001–2004. *Diabetes Care* **34**: 1642–7

JOURNAL OF THE AMERICAN GERIATRICS ASSOCIATION

Reducing sitting time may improve metabolic health

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 To examine associations between overall sitting time (OST) and the metabolic syndrome (MS), the authors undertook a cross-sectional study of older people living in Australia.

2 People (n=1958; mean age 69 years; 54% women) from the AusDiab study were investigated for self-reported OST using an interviewer-administered questionnaire.

3 Compared with those in the lowest quartile, the odds ratios of the MS in the highest quartile for OST were 1.57 (95% confidence interval [CI], 1.02–2.41) for men and 1.56 (95% CI, 1.09–2.24) for women. OST was associated with greater risk of high triglyceride levels in men and women, abdominal obesity in women, and low HDL-cholesterol levels in men.

4 The authors concluded that reducing OST among older people may be a means to improving metabolic health.

Gardiner PA, Healy GN, Eakin EG et al (2011) Associations between television viewing time and overall sitting time with the metabolic syndrome in older men and women: the Australian Diabetes, Obesity and Lifestyle study. *J Am Geriatr Soc* **59**: 788–96

OBESITY SURGERY

Successes and risks of bariatric surgery in people with CKD

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 The authors reported outcomes of laparoscopic sleeve gastrectomy (LSG) in obese people with chronic kidney disease (CKD).

2 LSG was undertaken in nine obese people with CKD (two with T2D; five undergoing haemodialysis treatment). As a result, a mean decrease of 8.4 kg/m^2 in BMI and excess weight loss of 43% at 6 months was achieved, and four of the five participants on haemodialysis were added to the kidney transplantation waiting list as a result of weight loss.

3 Adverse events comprised: one myocardial infarction; one episode of acute kidney injury secondary to dehydration; an episode of compromised dialysis access; and one gastric leak (7 months post-LSG).

4 The authors concluded that LSG is an effective treatment for obesity in people with CKD, but that additional risks are associated with the procedure in people with CKD.

Maclaughlin HL, Hall WL, Patel AG, Macdougall IC (2011) Laparoscopic sleeve gastrectomy is a novel and effective treatment for obesity in patients with chronic kidney disease. *Obes Surg* [Epub ahead of print]

AM J EPIDEMIOLOGY

Abdominal obesity, not BMI, indicator of mortality risk in T2D

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 Associations between BMI, waist circumference, waist/hip and waist–height ratio and mortality were assessed in 5435 individuals with T2D.

2 Mean participant age was 57.3 years, 54% were men, median T2D duration was 4.6 years, and 22% of the participants used insulin.

3 BMI as an indicator of general obesity was not associated with higher mortality, whereas all measurements of abdominal obesity showed a positive association; the strongest association was observed for waist–height ratio (hazard ratio, 1.88 for men and 2.46 for women).

4 The authors suggested that the respective indicators might be used in risk prediction models.

Sluik D, Boeing H, Montonen J et al (2011) Associations between general and abdominal adiposity and mortality in individuals with diabetes mellitus. *Am J Epidemiol* **174**: 22–34

"BMI as an indicator of general obesity was not associated with higher mortality, whereas all measurements of abdominal obesity showed a positive association ..."