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CO-MORBIDITIES OF OBESITY

15. Obesity – risk factor of cancer?

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Cancer is leading cause of death worldwide and the prevalence of obesity has more than doubled over the past 40 years. Numerous meta-analyses support the link between excess body weight and increased risk of developing and dying from several types of cancer. The reported associations may be causal or some malignancies, but they may be flawed owing to inherent biases that exaggerate the effect of obesity on cancer incidence and mortality. Excess body weight is associated with increased risk of of developing and dying from many diseases including ancer, type 2 diabetes and cardiovascular disease. Obesity has become a major public health challenge; its prevalence worldwide has more than doubled among women and tripled among men in the past four decades. The number of overweight and obese people has risen from approximately 857 million in 1980 to 2.1 billion in 2013. Several meta-analyses support the link between obesity and cancer, but substantial heterogeneity exists between studies. A recent umbrella review found that despite strong claims of a statistically significant association between type 2 diabetes and several cancers only a fraction (14 %) of the 27 studied associations were supported by robust evidence without any potential bias. The strong evidence to support the positive association between obesity was found in 11 o the 36 cancer sites and subtypes that were examined, predominantly comprising cancers of the digestive organs and hormone related malignancies in women. Substantial uncertainty remains for the other cancers. To draw firmer conclusions we need prospective studies and larger consortiums with better assessment of the changing nature of body fatness and with comprehensive standardized reporting of analyses. As obesity becomes one of the greatest public health problems worldwide, evidence of the strength of associations between obesity and cancer may allow finer selection of people at high risk, who could be selected for personalised primary and secondary preventive strategies.

16. Obstructive sleep apnoea and endocrinology

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Research in obstructive sleep apnoea syndrome (OSA) requires wide interdisciplinary approach. Pathophysiological mechanism in OSA, which can cause severe health consequences are very complex and need to be elucidated. OSA is considered as important factor disturbing sleep and circadian rhythm, not only in snorers, but also in bed partners. Intermittent hypoxia, sleep fragmentation, excessive daytime sleepiness (EDS), obesity, hypertension, atherosclerosis, cerebral strokes, cardiac arrhythmias, hyperglycaemia, insulin resistance, polycystic ovary syndrome and impaired hormonal secretion can be found in OSA patients. Also endocrine diseases itself may disturb breathing during sleep and decrease sleep efficiency. For example acromegaly, hypothyreosis, hypercortisolism. Neuroendocrine mechanism play a role in control of breathing as well as during initiation and sleep maintaining. Level of melatonin, testosterone, signalling molecules, adipose tissue hormones (leptin, adiponectin), free fatty acids, pro-inflammatory cytokines, interleukins IL 1, IL 6, TNF alpha in the blood are involved. Secretion of some hormones differ during slow wave and REM stages of sleep. The deep sleep phase in the first part of the night are characterized with minimum cortisol and maximum of growth hormone concentration. Decreased glucose consumption in non-REM and increased in REM can be observed. In obese patients hypothalamic cortico-liberin (CRH) hypofunction plays a major role in pathogenesis of sleep apnoea, sleepiness and cardiovascular comorbidities. This paper maps and summarizes recent opinion and hypothesis, which links patho-mechanism in OSA with endocrinology. Some of them look bizarre or hardly probably at the first view, however in the future could be used for development of new drugs or treatment.

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17. Excessive daytime sleepiness in acute ischemic stroke; association with obesity, diabetes mellitus, restless legs syndrome and sleep-disordered breathing

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Background: The prevalence of sleep-disordered breathing (SDB), excessive daytime sleepiness (EDS), and restless legs syndrome (RLS) is ranging among stroke survivors up to 91 %, 72 % and 15 % respectively. Obesity is considered to be one of the most important mechanisms underlying SDB. Although the relationship between EDS and SDB is well described, there are insufficient data regarding the association of EDS with RLS. The aim of this study was to explore the association between EDS, SDB, RLS and other clinical characteristics including obesity in acute ischemic stroke. **Methods:** We enrolled 152 patients with acute ischemic stroke. Epworth Sleepiness Scale (ESS) was used to assess EDS. SDB was assessed using standard overnight polysomnography. All patients filled in a questionnaire focused on RLS. Clinical characteristics and medication were recorded on admission. **Results:** EDS was present in 16 (10.5 %), SDB in 90 (59.2 %) and RLS in 23 patients (15.1 %). Presence of RLS (beta = 0.209; p = 0.009), diabetes mellitus (beta = 0.193; p = 0.023) and body mass index (beta = 0.171; p = 0.042) were the only independent variables significantly associated with ESS in multiple linear regression analysis. **Conclusion:** Our results suggest significant association of EDS with RLS, diabetes mellitus and body mass index in patients with acute ischemic stroke. RLS, obesity and metabolic factors seem to be the most important variables associated with the measures of EDS, while the role of SDB seems to be minor.

18. Importance of different grades of abdominal obesity on testosterone level, erectile dysfunction, and clinical coincidence

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The aim of the current study was to investigate the influence of different grades of abdominal obesity (AO) on the prevalence of testosterone deficiency syndrome (TDS), erectile dysfunction (ED), and metabolic syndrome (MetS). **Material and methods:** In a cross-sectional descriptive study, a total of 216 males underwent a complete urological, internal, and hormonal evaluation. Males were divided according to waist circumference into five groups: less than 94 cm [Grade (G) 0], 94 to 101 cm (G1), 102 to 109 cm (G2), 110 to 119 cm (G3), and more than 120 cm (G4). Incidence of ED, TDS, and MetS was compared in these groups and in participants without AO. **Results:** Some degree of ED was identified in 74.7 % of males with AO. In G1, there were 61 % of males with ED, in G2 68 %, in G3 83 %, and in G4 87 %. A strong correlation between testosterone (TST) level and AO was identified. Ninety-eight out of 198 (49.5 %) males with AO and 1/18 (5.5 %) males without AO had TDS. There were significant differences between individual groups. In the group of males with AO G4 (more than 120 cm), 87.1 % had TDS. MetS was diagnosed in 105/198 (53.0 %) males with AO, but in G4, 83.9 % of males with AO had MetS. **Conclusion:** Males older than 40 years of age with AO have a higher incidence of ED, TDS, and MetS. Dividing males into five groups according to waist circumference seems to be reasonable. With growing AO, there were significantly more males with ED, TDS, and MetS.

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19. Higher estrogen level is associated with depression in obese men

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Background: Depression is one of the most commonly occurring, serious disorders associated with increased morbidity and mortality. The association of depression with obesity has been shown in several studies, although the underlying factors of that contribute to establishing and maintaining depression in obese are not clearly understood. Hormonal changes, mostly changes in sex hormones related to obesity, are among them. The aim of this study is to investigate the association of BMI and sex-hormone levels in men and to explore whether these alterations are associated with depression in men. **Patients and methods:** Data were obtained from the LIFE-Adult-Study, a population-based cohort study. A total of 3,925 men, 2,244 younger than 60 years (mean age 47.6 ± 8.0 years, mean BMI 27.1 ± 4.3 kg/m^2) and 1,681 men older than 60 years (mean age 68.9 ± 5.1 years, mean BMI 28.2 ± 3.9 kg/m^2) were included into analyses. Associations of anthropometric, hormonal parameters and depression symptoms according to CES-D score were evaluated using t-test, Pearson's correlations, multiple linear regression analysis and logistic regression analysis. *Results.* In younger men, we found a significant decreased sex hormone-binding globulin (35.4 ± 14.1 nmol/L, $p < 0.001$ in overweight and 31.8 ± 14.3 nmol/L, $p < 0.001$ in obese), total testosterone (15.8 ± 5.2 nmol/L, $p < 0.001$ in overweight and 12.6 ± 4.7 nmol/L, $p < 0.001$ in obese) and free testosterone (300.8 ± 78.6 nmol/L, $p < 0.001$ in overweight and 249.0 ± 73.9 nmol/L, $p < 0.001$ in obese) levels compared to normal weight males. In older men we observed a decreased sex hormone-binding globulin (47.9 ± 18.8 nmol/L, $p < 0.001$ in overweight and 45.2 ± 20.0 nmol/L, $p < 0.001$ in obese), total testosterone (15.9 ± 5.4 nmol/L, $p < 0.001$ in overweight and 13.8 ± 6.9 nmol/L, $p < 0.001$ obese), free testosterone (217.8 ± 71.2 nmol/L, $p < 0.001$ in obese), and an increased estradiol (90.1 ± 41.0 pmol/L, $p = 0.005$ in overweight and 97.3 ± 43.0 pmol/L $p < 0.001$ in obese) compared to normal weight males. In logistic regression analyses, increased estradiol ($\Delta R2 = 0.003$, OR = 0.318, $p = 0.013$) was associated with positive depressive symptomatology in men up to 60 years. **Conclusions:** BMI was strongly associated with sex hormone levels, while certain differences can be seen between younger and older men. Among all tested sex hormones, we found an association of increased estradiol level with positive depressive symptomatology in younger, but not in older men.