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# Body composition as a predictor of chemotherapy toxicity in patients with metastatic prostate cancer treated with docetaxel

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Body composition is an important prognostic factor in cancer and evidence supporting a strong link between low skeletal muscle mass (sarcopenia) and chemotherapy toxicity is increasing[(1)]. Docetaxel is standard first line treatment for castrate resistant prostate cancer (CRPC)[(2)]. The aim of this study was to correlate body composition (by computed tomography (CT)) with toxicity to docetaxel in CRPC.

Patients with CRPC who received docetaxel between 2008–2013 were included. Correlations between patient characteristics, body composition and toxicity to chemotherapy were analyzed. Skeletal muscle was measured by CT and sarcopenia was defined using published cut offs[(3)]. Toxicity was assessed using Common Terminology Criteria for Adverse Effects v4.0.

63 pts, mean age 69y (SD 8), were included. In total 76 % of pts were overweight or obese (BMI > 25 kg/m$^2$). Sarcopenia was present in 71·4 % (n = 45) and of these 31 (68·8 %) were both sarcopenic and overweight or obese. Sarcopenic patients had a lower BMI (26·6 vs. 30·9 kg/m$^2$, $p < 0·001$) compared to non-sarcopenic pts. Grade 3–4 toxicity was seen in 23 % (n = 14) during the first 3 cycles of treatment, the most common being peripheral neuropathy (40 %), neurosensory (36 %) and anaemia (33 %). Neutropenia and neurosensory toxicities were more prevalent in sarcopenic patients ($p < 0·05$). Patients with a skeletal muscle index (SMI) < 25$^{th}$ centile (45cm$^2$/m$^2$) received less treatment compared to patients with SMI > 75$^{th}$ centile (88 days vs 153 days, $p = 0·055$). Analysing the drug dose according to SMI(cm$^2$/m$^2$), 32 % of patients receiving a dose >75$^{th}$ centile (1·98 mg/SMI) experienced neutropenia in the first 3 cycles vs 0 % receiving a dose <25$^{th}$ centile (1·347 mg/SMI;$p < 0·05$). High BMI was significantly associated with better survival, BMI ≥ 25 kg/m$^2$: 586 days vs 418 days for BMI<25 kg/m$^2$ , $p < 0·05$. CRP was also prognostically significant, with values >75$^{th}$ centile (133 mg/dl) having a shorter survival compared to pts with CRP < 75$^{th}$ centile (150 vs. 661 days; $p < 0·05$).

Sarcopenia is highly prevalent in pts with CRPC receiving docetaxel but is masked by excessive adiposity. Very low skeletal muscle mass is associated with less treatment days and increased neurological and haematological toxicities. High BMI is associated with longer survival.

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