Weighing In: Actual vs Ideal vs Adjusted Body Weight to Calculate Dose of Melphalan in Patients with Multiple Myeloma Undergoing Autologous Stem Cell Transplantation

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Introduction

More than one-third of Adults in the United States are obese. Obesity plays a significant role in chemotherapy dosing. The literature on how or if doses should be modified is conflicting and scant. Some evidence has shown that dose reductions related to obesity, while reducing toxicities, may result in decreased survival outcomes. High-dose Melphalan is the standard chemotherapy regimen used in autologous stem cell transplantation for multiple myeloma. There are no established guidelines about the methods of calculating the final dose of Melphalan based on patients’ weight. This issue is of particular importance because of the current epidemic of obesity and because of the known association between MM and obesity.

Methods

Methods for calculating dose reductions vary from the use of an adjusted body weight (AjBW), ideal body weight (IBW), or a lean body weight. Our institution uses the AjBW to calculate the final Melphalan dose, based on the formula AjBW = IBW + 0.25(ABW - IBW), where IBW and ABW are the ideal and the actual body weights, respectively. We reviewed data of 30 consecutive Multiple Myeloma patients undergoing Autologous Stem Cell Transplant and analyzed the variability of using Melphalan with their IBW, AjBW, and ABW.

Findings

• Mean body mass index (BMI) of our patients was 28.2; range 17.4-39.7, S.D. ±5.2.
• Mean final doses of Melphalan were 307 (±58), 321 (±60), 357 (±71) mg, using IBW, AjBW, and ABW, respectively (p=0.008).
• Compared with ABW dosing, we observed a >10% dose reduction of Melphalan using AjBW and IBW when BMI exceeded 29.8 and 27.4, respectively (Figure 1).
• BMI >34.5 led to a >20% dose reductions with both AjBW and IBW.

Discussion

The American Society of Clinical Oncology recommends that chemotherapy doses, particularly those with a curative intent, be based on full body weight in obese patients unless contraindicated due to comorbidities. This retrospective review offers empirical evidence that AjBW formula leads to a significant reduction of the Melphalan dose in overweight/obese patients.

Conclusions

Further research is necessary to optimize dosing of Melphalan in these patients and to establish whether use of AjBW vs ABW negatively affects Autologous Stem Cell Transplant efficacy in Multiple Myeloma patients.

References

