

## ABSTRACT

The aim of this study is to investigate the use of the simpler porphyrin, Hematoporphyrin (Hp) as a possible photosensitizer for the treatment of malignancies using the alternative Immediate photodynamic therapy (PDT) procedure. In Immediate PDT, photoradiation was administered 5 mins after the administration of drugs as opposed to the conventional delayed (24-48 hrs) treatment procedure. The serum and tissues pharmacokinetics of Hp with comparison to its derivatives, HpD and their therapeutic efficacies have been investigated. A five compartmental model was developed to quantify the analysis of serum and tissue distribution of the drugs with liver as the main store. The pharmacokinetics showed that Hp has a 4 times smaller half-life in serum than HpD. The oligomeric component of HpD has an excretion rate of about 90 times slower from the liver than the monomeric component of Hp from the serum and tissues. The murine tumour response indicated that Hp needed a 3.5 times more drug-light dose product for a similar therapeutic effect with comparison to HpD. Nevertheless one could still minimise skin photosensitivity because of its rapid excretion. A study on the histomorphological changes in both the drugs indicated comparable tumour cell, surrounding normal tissue and vasculature necrosis. A comparison of the skin reaction and the duration of skin photosensitivity were also investigated. The results showed that Hp exhibited negligible skin photosensitivity compared to HpD. In order to develop a local Hp-Immediate PDT protocol for clinical trials in the near future, the conventional delayed PDT procedure with HpD was employed on three patients for the necessity of groundwork. The basis of this includes the preparation and characterization of HpD and the development of two alternative halogen light sources. Studies carried out using the halogen light sources