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Awareness of Vinca alkaloids among dental students

Nithyanandham Masilamani, Dhanraj Ganapathy*

Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, India

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ABSTRACT

Vincristine along with vinblastine are dual indole-based conjugated Vinca alkaloids formed from the foliage of the herb Catharanthusroseus, traditionally known as Vincarosea vincristine, that have been effectively prescribed as a single treatment and also in conjunction with other medications in hematological and stable malignancies chemotherapy for tumors. The purpose of this survey was to assess awareness of medical use of vinca alkaloids among dental undergraduate students. A cross-section study was performed with a self-directed survey questionnaire containing 10 queries distributed among 100 dental students. The questionnaire assessed the awareness about vinca alkaloids, their medicinal uses, anticancer activity, mechanism of action and side effects. The responses were recorded and analysed. 94% of the respondents were not aware of medical uses of vinca alkaloids. 95% were not aware of anticancer activity of vinca alkaloids. 97 % were not aware of the mechanisms of action of vinca alkaloids. Again 97% were not aware of side effects of the vinca alkaloids. This study concluded the awareness about the medical use of vinca alkaloids among dental students was poor. Majority of them are not aware of the anticancer activity of vinca alkaloids.

*Corresponding Author

Name: Dhanraj Ganapathy
Phone: 9841504523
Email: dhanrajmganapathy@yahoo.co.in

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INTRODUCTION

Vincristine along with vinblastine are dual indole-based conjugated Vinca alkaloids formed from the foliage of the herb Catharanthusroseus, traditionally known as Vincarosea vincristine, that have been effectively prescribed as a single treatment and also in conjunction with other medications in hematogenic and stable malignancies chemotherapy for tumors. They restrain Microtubulin (MT) by preventing the functionalization of tubulin. In the process of cell proliferation, they serve as antagonists mostly during metaphase of the cellular phase and therefore, by allowing microtubules to impede the progress of the mitotic spindle. In cancerous cells, these medicines interfere with the DNA fixing and RNA-combination of DNA-subordinated RNA polymerase[1-4] (Einhorn, 1977; Gigant *et al.*, 2005; Rao *et al.*, 1985; Williams *et al.*, 1987).

VLB is efficacious in the management of multiple malignancies like Hodgkin's disease, and VCR has been shown to be sufficient for acute lymphoblastic leukemia. Vinca alkaloids may induce leukopenia and neurotoxicity. Oncolytic migration of these heterodimers alkaloids has been associated with the mitotic shaft hurting through mitotic capture. Such alkaloids also alter the speed of axoplasmic transportation by making an alteration in neurotubules. Cytotoxicity and fringe neuropathy can be a consequence of the critical mechanism of action of such alkaloids by virtue of tubulin.

Microtubules (MTs) play the main role during the time spent with the mitosis, after which chromosomes of the cell are replicated and segregated to frame two identical subsets, allowing cellular division into two daughter cells. MTs are linked with support for cell form, cell motility, intracellular vessel and numerous additional cell ability. The MTs are made from tubulin, βheterodimers. Such structures undergo extraordinarily strong polymerization and depolymerization as a result of the transient expansion of the tubulin dimers at their extreme. Vinca alkaloids act by impedance with this dynamic balance, by either hindering tubulin polymerization and blocking MT dismantling, forestalls appropriate MT work and at last prompts cell death (Owellen *et al.*, 1972; Wilson *et al.*, 1970). Oral disease is one of the most harmful tumours and it can require chemotherapy. Thus it is basic the dental specialists and dental understudies know about the different chemotherapeutic agents, vinca alkaloids being one of them, utilized in the treatment of malignancy. The purpose of this survey was to assess awareness of medical use of vinca alkaloids among dental undergraduate students.

MATERIALS AND METHODS

A cross-section study was performed with a self-directed survey questionnaire containing 10 queries distributed among 100 dental students. The questionnaire assessed the awareness about vinca alkaloids, their medicinal uses, anticancer activity, mechanism of action and side effects. The responses were recorded and analysed.

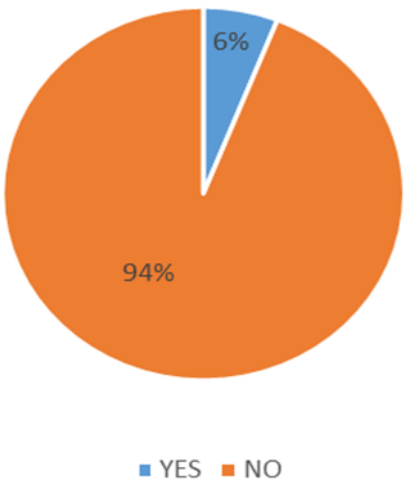

Figure 1: Awareness of medical uses of vinca alkaloids

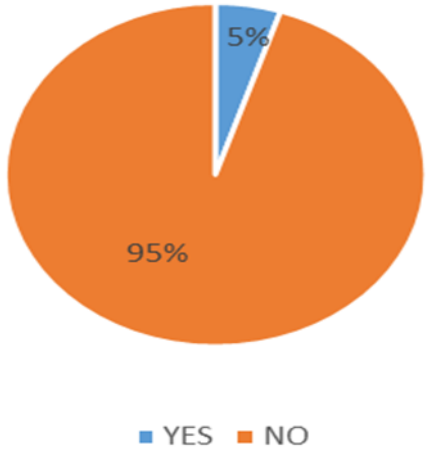

Figure 2: Awareness of anticancer activity of vinca alkaloids

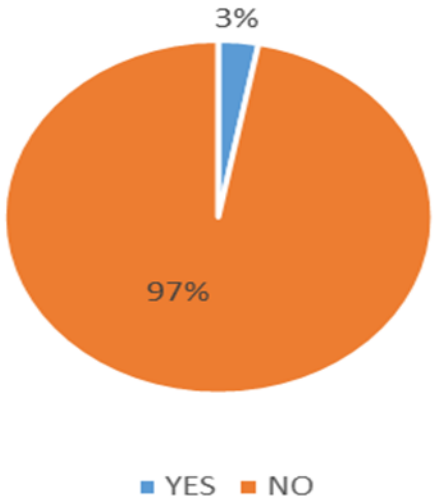

Figure 3: Awareness of mechanism of action of vinca alkaloids

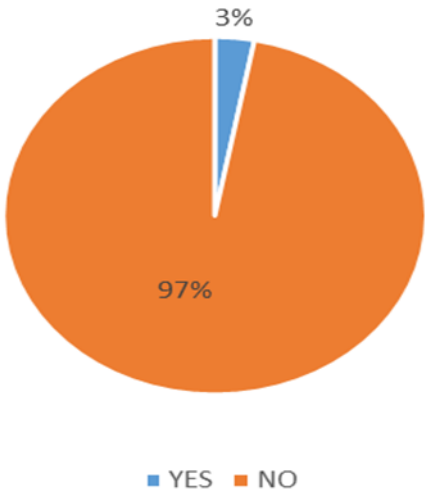

Figure 4: Awareness of side effects of vinca alkaloids

RESULTS AND DISCUSSION

94% of the respondents were not aware of medical uses of vinca alkaloids(Figure 1).95% were not aware of anticancer activity of vinca alkaloids (Figure 2).97 % were not aware of the mechanism of action of vinca alkaloids (Figure 3). Again 97% were not aware of the side effects of vinca alkaloids (Figure 4).

Vinblastine is among the fewer tubulin-focused alkaloids responsible for many of the chemotherapeutic accomplishments after their introduction as anti-tumour medications. Vinblastine and the amino-terminal fragment of locally restrictive RB3-SLD shares a hydrophobic link on the a-tubulin substrate located at the intermolecular interface in microtubules. It is an enticing target for drugs planned to antagonise microtubule components by interfacial impedance and tubulin appears to be suitable due to its ability to self-associate (Williams *et al.*, 1987).

The antimitotic portion of high-fixed vinca alkaloids depolymerizes MTs and destabilizes mitotic shafts: the dividing disease cells tend to be impeded by dense chromosomal mitosis. At low concentrations, the mitosis becomes all the more unpretentious, and the cells knocked with apoptosis. Vinca alkaloids and various colchicine-restricting agents were shown to cause severe and rapid vascular disruption, contributing to the tumour necrosis. The vinca region includes both vinca sites, where severe inhibitors bind, and the local area, where non-competitive inhibitors bind. Vincristine, vinblastine, maytansine, ansamitocines P-3, P-4, rhizoxin and disorazole A1 bind at the vinca location and severely impede the ability to produce tubulin.

The vinblastin-23-oyl amino destructive substrate was introduced by linking the amino corrosive carboxyl esters to a vinblastin-23-oyl moiety via the amide linkage. A few vector amino acids were analyzed over four basic groups based on the extremity of the side chains. In addition, the effect of auxiliary modifications, for instance (1) the proximity of the amino-corrosive transporter to the C-23-oyl moiety, (2) the concept of the amino-corrosive carboxylic ester, (3) the distance of the amino-corrosive alkyl chain, (4) only the stereoisomericity of the amino-corrosive component, and (5) again the reacetylation of hydroxyl range (position 0-4) of the whole vindoline moiety.

Throughout years, numerous research groups have worked extensively and substantially to integrate new vinblastine and vincristine subordinates. Modifications in vindoline framework or the catharanthine moiety have resulted in a variety of new antitumor specialists medications with higher selectivity or less toxic properties. The method of action of Vinca alkaloids was evaluated using these novel subordinates and some significant new results were identified for the tubulin polymerization framework. The structure of these dimers is a continuous source of further discovery in this discipline of medicine and therapy (Keglevich *et al.*, 2012; Marantz *et al.*, 1969; Venghateri *et al.*, 2013).

This study inferred the dental student's knowledge about vinca alkaloids is poor. They are not aware of the antitumour effectiveness of vinca alkaloids and they are unaware of the side effects of these compounds also. These modifications can further enhance the anticancer activity of these compounds. The researchers can further advance the development of newer vinca derivatives in the management of cancer.

CONCLUSION

This study concluded the awareness about the medical use of vinca alkaloids among dental students was poor. Majority of them are not aware of the anticancer activity of vinca alkaloids. Further rigorous continuing education programs and awareness-raising workshops are therefore required to enhance the knowledge and understanding of vinca alkaloids amongst dental students.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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