



## POVIDONE-IODINE USED AS A HEMOSTYPTIC AGENT- A PROSPECTIVE STUDY

## Dental Science

**Dr. Afreen Nadaf\*** Consultant, Deptt. of Oral and Dental Pathology \*Corresponding Author

**Dr. Tajamul Hakim** Registrar, Deptt. of Oral Surgery

**Dr. Shahid Farooq** Registrar, Deptt. of Oral Surgery

## ABSTRACT

In oral surgery povidone-iodine is used for irrigating alveolar sockets of mandibular impacted molars following surgical removal. The Dental surgeons involved in this study did irrigation of extraction sockets with povidone-iodine which led to arrest of bleeding in patients. Fifty patients were selected and divided equally into treatment and control groups. Povidone-iodine (175mg) was used for irrigation of extraction sockets in the treatment group and saline was used in the control group. In the treatment group, 20 patients showed cessation of bleeding compared to only 5 in the control group. Povidone-iodine significantly ( $P < 0.01$ ) controlled bleeding as compared to saline. Iodine is corrosive due to its oxidizing potential character while povidone is a thickening and granulating agent; together they may have a chemocauterization effect that could be the reason for the cessation of bleeding. These results suggest that povidone-iodine act as an antiseptic as well as a hemostyptic agents.

## KEYWORDS

povidone-iodine, styptic, hemostasis.

## INTRODUCTION:

Topical antimicrobial agents is commonly used in clean and contaminated surgical wounds, based on the premise that reduction of superficial bacterial contamination aids wound healing. Povidone iodine (PVP-I) is a widely used and highly potent antiseptic. Iodine was first used medically to produce inflammation and obliteration of serous cavities<sup>7,10</sup>. It is commonly used both on intact skin in preparation for surgery and on open wounds. Acute lacerations are soaked in iodine and surgical wounds are freely irrigated with it. PVP-I is formed by binding free iodine to polyvinyl-pyrrolidone (PVP), a solubilising agent. This is done to decrease the toxicity of the iodine. As iodine is liberated from the PVP molecule it exerts its antimicrobial effect<sup>2</sup>. Once released, iodine is toxic to microorganisms because it combines irreversibly with tyrosine residues of proteins, interferes with the formation of hydrogen bonding by some amino acids and nucleic acids, oxidizes sulfhydryl groups and reacts with sites of unsaturation in lipids<sup>3,5</sup>. In addition to antibiotic prophylaxis, preparation of the surgical field with PVP-I has been widely recommended<sup>9</sup>. In oral surgery, PVP-I is used as an irrigant of the alveolar sockets following dental extractions. Indications for extraction include: end-stage periodontal disease, end-stage endodontic disease, pulp exposure when endodontic treatment is not elected, malocclusions, crowding, retained deciduous teeth, trauma, and so forth. The present surgeons observed by chance that there was a cessation of fresh bleeding in some patients after irrigation with PVP-I. A review of literature search was then conducted to find any previous studies on the styptic action of PVP-I. The only relevant study found was by HELLEM and NORDENRAM<sup>4</sup>, who used a gauze sponge saturated with Whitehead's varnish (a combination of iodoform, balsam toluatan and styrax liquid in a base liquid) that was sutured over the alveolar socket following dental extractions; they found that the dressing reduced pain, swelling and trismus<sup>1</sup>. Every oral surgeon would desire a topical anti-microbial irrigant which can also act as a hemostyptic. A hemostyptic is an agent which causes haemostasis, the complete cessation of bleeding, due to its astringent property. PVP-I seems to fulfil this desire, but this conclusion warrants a clinical appraisal, and hence this study.

## MATERIALS AND METHODS

This study was a single blind randomized control trial carried out on 50 healthy outpatients who needed 3<sup>rd</sup> molar surgical extractions. A written consent was taken from the patients before conducting the study. The patients were divided into 2 groups (n = 25), the treatment and control groups; the control group had 05 women and 20 men and the treatment group consisted of 11 women and 14 men.

## Inclusion and exclusion criteria:

## Inclusion criteria

1. Age between 16 and 60 years

2. No history of bleeding disorders/platelet disorders
3. No history of eventful previous extractions

## Exclusion criteria

1. Conditions, such as periodontitis, gingivitis and dental abscess
2. Patients on anti-coagulant therapy
3. History of hypersensitivity to iodine
4. Long-term NSAID therapy
5. long term steroid therapy
6. Patients on chemotherapy drugs.

The alveolar sockets of the treatment-group patients were irrigated with PVP-I (175mg) plus saline (sodium chloride 0.9%) following surgical extraction of 3<sup>rd</sup> molar, whereas those of the control-group patients were irrigated with saline only. Spontaneous stoppage of bleeding from the socket following irrigation was considered as significant haemostasis. Haemostasis was examined visually.

## RESULTS

In the treatment group, 20 of the 25 patients showed spontaneous cessation of fresh bleeding following irrigation of the extraction socket with PVP-I, while this was observed in only 5 of the 25 patients irrigated with saline. This observation was made before drying the socket with gauze following which the sockets were compressed. Postextraction bleeding was significantly ( $P < 0.01$ ) controlled by PVP-I as compared to saline. No postoperative complications were observed in the patients of either group.

## DISCUSSION

Povidone is a synthetic polymer of 1-vinylpyrrolidone, which is hygroscopic and readily soluble in water. It is also a thickening and dispersing agent with tablet binding capacity<sup>6</sup>. Iodine has a corrosive effect on tissues due to its oxidizing potential<sup>8</sup>. The haemostasis observed on irrigation with PVP-I may well be within the ambit of the local actions produced by the iodophore. It seems possible that it is due to the corrosive property of iodine and the thickening and binding properties of povidone while no attempt has been made in this study to elucidate the mechanism of the hemostyptic action of PVP-I. Iodine may chemocauterize the tissues while povidone may aid in clotting. Irrigation of the extraction socket with PVP-I plus saline significantly controlled bleeding as compared to saline alone. From this it can be concluded that PVP-I has a hemostyptic as well as being an antiseptic action. Further studies are needed to elucidate the mechanism of action. It is hereby recommended that oral surgeons unambiguously use PVP-I to irrigate postextraction sockets.

## REFERENCES

1. Alexander RE. Dental extraction wound management: a case against medicating postextraction sockets. *J Oral Maxillofac Surg* 2000; 58: 538-551.

2. Dedo DD, Alonso WA, Ogura JH. Povidone-iodine an adjunct in the treatment of wound infections, dehiscences and fistulas in head and neck surgery. *Trans Am Acad Ophthalmol Otolaryngol* 1977; 84: 68-74.
3. Gottardi W. Iodine and iodine compounds. In: Block SS, ed: *Disinfection, Sterilization and Preservation*. Philadelphia: Lea & Febiger 1983: 183-196.
4. Hellem S, Nordenram A. Prevention of postoperative symptoms by general antibiotic treatment and local bandage in removal of mandibular third molars. *Int J Oral Surg* 1973; 2: 273.
5. Markham SM, Rock J. Preoperative care. In: Rock JA, Thompson JD, eds: *Te Linde's Operative Gynaecology* 8th edn. Philadelphia: Lippincott-Raven 1997:233-243.
6. SEAN C SWEETMAN (Ed.). *Disinfectants and preservatives*. In: *Martindale the Complete Drug Reference*. 33rd edn. London 2002: 1155.
7. Senn N. Iodine in surgery with special reference to its use as an antiseptic. *Surg Gynecol Obstet* 1905: 1: 1-10.
8. SWARYARD EA, LOWENTHAL N (Eds), *Pharmaceutical Necessities*. In: *Remington's Pharmaceutical Sciences*. 18th edn. Philadelphia 1990: 1307.
9. Sweet RL, Gibbs RS, eds: *Wound and episiotomy infection*. In: *Infectious Diseases of the female Genital Tract* 2nd edn. Baltimore: Williams and Wilkins 1990: 374-382.
10. B. P. R. Kumar, A. Maddi, K. V. Ramesh, M. J. Baliga, S. N. Rao, Meenakshi: Is povidone-iodine a hemostyptic?. *Int. J. Oral Maxillofac. Surg.* 2006; 35: 765-766.