Laser Oropharyngeal Surgeries Versus Non- Laser Oropharyngeal Surgical Procedures

Khalid Mohamed Bofares,*

Abstract:

Back ground and objectives: CO_2 laser is now being used for different oropharyngeal surgical procedures. On the other hand these same surgical procedures are being performed by non-laser activities which create higher risk of postoperative sequels and complications as well as more tendency to postoperative handicapping with longer duration of hospitalization. Therefore this study was conducted prospectively to confirm that CO_2 laser had been improving the postoperative status of oropharyngeal surgical procedures as compared to non-laser techniques.

Materials and methods: 35 patients aged 7-53 years of different oropharyngeal disorders, namely chronic hypertrophied tonsils who underwent tonsillectomy, sleep apnea syndrome with redundant palate and large uvula who operated by uvula palatopharyngoplasty (uppp), uvular cysts and base of tongue haemingiomas who operated by laser and non-laser excisions. The patients were divided into two groups, group-A which included 15 patients and operated by CO_2 laser technique, group-B in which patients operated by non-laser surgical procedures and in both groups by random distribution, the Varity of previously mentioned oropharyngeal lesions were included. The both groups compared in relation to operative time consumption, intra operative bleeding, postoperative dysphagia and odynophagia, postoperative oral intake, vomiting tendency, referred otalgia, fever, otitis media, septicemia, airway obstruction; the period of postoperative hospitalization and healing process.

Results: 80% of patients who under went the CO_2 laser procedures showed non-significant intra operative and postoperative bleeding, non-significant dysphagia, odynophagia, referred otalgia, fever, and vomiting tendancy as compared to non-laser techniques with percentage of 37% who showed same results. 40% of patients of group-A stayed less than 6 hours postoperatively in hospital as compared to group-B in which all patients stayed $\geq$ 24 hours in the hospital after surgery. Regarding otitis media, airway obstruction and septicemia, in the both groups no cases were registered. The healing process as sequale of both procedures completed by one week.

Conclusion: Generally speaking CO_2 laser oropharyngeal surgical procedures, techniquely appear more easy, safe, and effective, with higher economic values as compared to the non-laser techniques which create higher risk of handicapping and complications.

Key words: Oropharyngeal surgery; CO_2 laser oropharyngeal surgery; CO_2 laser uvnlopalato-pharyngoplasty; CO_2 laser tonsillectomy.

Introduction:

Oropharyngeal surgical procedures are the most common surgical procedures in the specialty of otorhirolaryngology.[1] These procedures are including mainly tonsillectomy, partial mucosal palatal excision, uvulo-palatophuryngoplasty, and excisions of local pathologies as haemingiomas, local grannlomas, papillomas and cystic lesions.[2] these procedures can be performed by different surgical methods as dissection snare method, radiofrequency abilation method, CO-abilation method, electrical diathramy dissection, laser dissection method, photodynamic therapy dissection method radio therapy dissection method and cryosurgery.[3] There are varieties of postoperative significant problems associated with these surgical activities. Postoperative pain is significant problem that continues to be untreated in the pediatric and adult population.[4,5]

The postoperative pain can be in the form of sore throat, odynophagia, otalgia or trismus.[6,7] The presence of the postoperative pain especially in the form of sore throat or sever odynophagia may restrict swallowing and lead

*) Assistant Professor, Otorhinolaryngology department, Omar Almoukhtar University , Elbyda, Libya.

to sever dehydration and metabolic disturbances.[8] The other significant problems which are related to these procedures will be the bleeding,[9] and upper air way obstruction.[10,11] As, it's well-known, the oropharyngeal region is highly vascular region, thus the invasive surgical procedures of this region create high incidence of haemorrhage, which can be primary or reactionary or secondary bleeding. This bleeding may result in the high incidence of morbidity and mortality.[12] In addition, these invasive distractive surgical procedures at these areas may produce massive local oedema which is resulting in upper air way obstruction which also may be fatal.[13] Although many studies have been curried out to evaluate the effect of these different surgical methods regarding these intra-operative and postoperative, sequale and complications.[14-16] It was felt at the time of initiating this study, that there is a lack of dats and information at our country regarding the effectiveness of CO_2 laser in the improvement of the incidence of development of these problems compared to the other ordinary non-laser surgical procedures. The specific aims of the study were:

a) To asses the effect of CO_2 laser method on the incidence of the postoperative nociceptive effect and the sequale of this effect.

b) To compare the efficacy of CO_2 laser and the conventional non-laser surgical dissection for development of postoperative complica-tions namely pain, dehydration, hemorrhage, upper air way obstruction, otitis media, septicemia, postoperative hospitalliza-tion, process of healing and metabolic disturbances.

Patients and Methods:

Thirty-five patients aged 7-53 years with different oropharyngeal disorders, namely chronic hypertrophied tonsils who underwent tonsillectomy, sleep apnea syndrome (SAS) and obstructive snoring with redundant palate and large uvula who operated by uvula palatopharyngoplasty (uppp), uvular cysts and base of tongue haemingiomas who operated by laser and non-laser excisions. At ENT department, Althwora-hospital, El-Beda Libya, patients with renal diseases, gastrointestinal diseaseschronic pain states or daily in take of non steroidal anti inflammatory drugs (NSAID) were excluded. Informed consent was obtained from all families. All patients were admitted one day prior to surgery after normal routine investigations. The patients were divided into two groups in random distribution basis each group contains variety of ages and variety of pathologies from selected general spectrum. Fifteen patients underwent CO_2 laser operative technique in the second group, the patients operated by conventional non-laser procedures. All patients received diclofenac sodium as postoperative analgesic (1-3 my/kg) in three divided doses, first dose at the end of surgery before wake-up from anesthesia, with the second dose eight hours postoperatively, and third dose eight hours from second dose.[8] Inhalation anesthesia with halothane was used and supplemented with intravenous. Fentanyl 200-400mg., and intubation either performed by oral endotracheal or nasotracheal tube insertion.

Data were expressed by using descriptive analysis as means $\pm$ standard error of mean (s. e. m) and percentages, test of significance was curried out, using Chi-squar test and two way analysis of variance.[3] A probability less than 0.05 was considered as significant, the degree of significance was determined by using level of standard deviation test. Student -t- test was used for dependent sample, as well as contingency coefficient was calculated as measurement of association between nominal variables.

Results:

The results presented in the tables (1) and (2) showed significant reduction in postoperative throat pain and otalgia after CO_2 laser surgery in comparison to conventional non-laser surgery ($P < 0.001$). Therefore the amount of ingested fluids was increased significantly by performance of CO_2 laser techniques ($P < 0.001$) as compared to non-laser procedures. Table (3) showed significant ($P < 0.001$) less vomiting tendency by CO_2 laser surgeries: as compares to non-laser surgeries. Table (4) showed significant ($P < 0.001$) reduction in the incidence of bleeding in CO_2 laser procedures by comparison to conventional techniques which was in form of primary bleeding rather than reactionary or secondary bleeding. Table (5) presented the period of hospitalization which was significantly ($P < 0.001$) less than 24 hours in CO_2 laser techniquel as compared to non laser techniques. In fact there were no any recorded complications in form of otitis media, upper air way obstruction, and septicemia in this presenting study.

Table 1: Relationship between type of procedure and postoperative throat pain (P < 0.001).

	Type of procedure				
	CO2 laser		Non-laser		
	N	Percentage %	N	Percentage %	Total
Have no pain	12	080	11	055	23
Have pain	03	020	09	045	12
Total	15	100	20	100	35

Table 2: Relationship between type of procedure and postoperative otalgia (P < 0.001).

	Type of procedure				
	CO2 laser		Non-laser		
	N	Percentage %	N	Percentage %	Total
Have no pain	11	073.3	13	065	24
Have pain	4	026.7	07	035	11
Total	15	100.0	20	100	35

Table 3: Relationship between type of procedure and postoperative vomiting tendency (P < 0.001)

	Type of procedure				
	CO2 laser		Non-laser		
	N	Percentage %	N	Percentage %	Total
No	13	086.7	15	075	28
Yes	02	013.3	05	025	07
Total	15	100.0	20	100	35

Table 4: Relationship between type of procedure and bleeding incidence (P < 0.001)

	Type of procedure				
	CO2 laser		Non-laser		
	N	Percentage %	N	Percentage %	Total
No	14	093.3	15	075	29
Yes	01	006.7	05	025	06
Total	15	100.0	20	100	35

Table 5: Relationship between type of procedure and period of hospitalization (P < 0.001)

	Type of procedure				
	CO2 laser		Non-laser		
	N	Percentage %	N	Percentage %	Total
< 24 hours	13	086.7	00	000	13
> 24 hours	02	013.3	20	100	22
Total	15	100.0	20	100	35

Discussion:

Oropharyngeal surgical procedures are the most common surgical procedures in the specialty of otorhinolaryngology.[1]

Postoperative pain is significant problem that continues to be untreated in the pediatric as well as adult population.[2,3] Which leads to the inability to tolerate oral intake and unplanned hospitalization.

Prostaglandins contribute to pain and inflammation after tissue injuries, resulting in local free nerve endings stimulation and upper air way inflammatory reactive oedema[4] and the antinoci ceptive action of (NSAID) is attributed usually to the peripheral inhibition of prostaglandin synthesis.[5,6]

In our study, it was noted that the CO_2 laser surgical procedures created less pain as compared to the non-laser conventional techniques, this can be explained by the occurance of less local dystruction and thus less tissue injuries with CO_2 laser procedure as compared to non-laser techniques.

By the same explanation, once there is less tissue damage with CO_2 laser procedures, this will result in less bleeding tendency, and less local upper air way oedema as compared to non-laser procedures.

The pain intensity will affect the swallowing ability and therefore will effect the amount of oral liquid in take, the local healing process, and thus, the incidence of postoperative complications as dehydration, septicemia and otitis media. This will improve the time of hospitalization.

On the other hand, the vomiting tendency can be correlated with the pain intensity, that the pain severity is directly proportionate to the induction of vomiting tendency. This can be explained by the relationship between the pain and vaso vagal attack, (i.e) the pain is an important inducing factor of vaso vagal attack, thus will induce vomiting[3-7] and[13] this may explain the significant reduction of vomiting tendency after CO_2 laser compared to non-laser procedures.

Although there were multiple factors which usually affect severity of pain and tolerance of the patient to pain specially among the children, as the age factor. The older children can tolerate pain more than the younger children, and techniques which is used for bleeding control, the use of bipolar electro cattery and ligation technique create main painful situation as compared to pack pressure.[14] But the effects of these factors on the results of this study were over came by random selection of the patients who are involved in each group.

References:

1. Roy A, Deal Rosa C. Veechio TA Bleeding following tonsillectomy, a study of electro – coagulation and ligation techniques. Arch otolaryngol 1996; 102: 9-10.
2. Coleman J.J. Complication in head neck surgery. Surg clin North Am 66. 1986; 149.
3. M. Hasham , F. Mahmmoud. Evulation of Co_2 laser platoplasty in snoring due to palatal flutter. Msc – degree thesis Alexandria University. 1997 .
4. Nunes DA, Provan J, Crawford M. Postoperative tonsillectomy pain in pediatric patients. Arch otolaryng Head and Neck Surg 2000; 126: 837- 841.
5. Randall DA and Hoffer MF. Complications of tonsillectomy and adenoidectomy. Otolaryngol Head and Neck Surg 1998; 118: 61-68.
6. Tawalbeh MI. Comparative study of diclofenac sodium and paracetamol for treatment of pain after adeno-tonsillectomy in children. Saudi Medical Journal 2001; 22 (Vol. 2): 121-123.
7. Colbert SA, Mc Crory C, Hanlon Dm, Scully M, Tanner A, Doyle MA. Prospective study comparing intravenous tenoxicam with rectal diclofenac for pain relief in day case surgery. Eur J. Ana Sthesiol 1998; 15: 544-548.
8. Bofares KM; Salem AM. Comparative study of indomethacin and paracetamol for treatment of pain after adeno-tonsillectomy in children. GMJ 2006; 2 (Vol. 23): 41- 47.
9. Bear GA, Roaius HG, Koleh Ms. The effect of paracetamol or diclofenac administered before operation on postoperative pain behavior after adenoidectomy in small children. Anaesthesia 1997; 47: 1078- 1080.
10. Arthur CG and John E H. Somatic sensation: II. Pain, headache, and tenth edition, Harcourt health sciences, 2000; 554-556.

11. H.P. Rang, M. M. Dale and JM. Ritter. Analgesic drugs: In: Pharmacology, fourth edition, churchil living stone, 2002; 579-603.
12. Remington RD and Anthony A. Statistic with application to the biological and health science. Sec Edit, prentice. Hall, INC, England eliss, N, G. 1985.
13. Rains Ford KD, Velo. GP. Side effect of anti inflammatory analgesic drugs kluwer academic publishers. Lan. Caster 1992.
14. Gary AT. and Kevin TP. Central Nervous system: In: Anatomy and physiology fourth edition, Mosby and imprint of Elsevier science, 1999; 384.