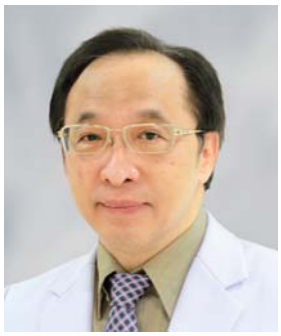
Original Article

Innovative Intracapsular Tonsillectomy: How we do it.



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Abstract

OBJECTIVE: To present a new technique of intracapsular tonsillectomy using carbondioxide CO_2 lasers, aiming to increase visibility by providing a better view of the tonsil and related structures in the obscure area by using the technique of rotating the operating table, 20°-30° instead of using a 30° endoscope.

MATERIALS AND METHODS: From October 23, 2014 to October 23, 2015, 124 patients underwent an intracapsular tonsillectomy using a CO_2 laser with the technique of rotating the operating table 20°-30° to have a clearer view of the tonsil tissue and the related structure. Absorbable suture material (3-0 vicryl) is also used to tie 6-8 areas of each side of the tonsillar capsule to prevent post-tonsillectomy bleeding.

RESULTS: Rotating the operating table 20°-30° to the left and to the right while operating the intracapsular tonsillectomy using a CO_2 laser helps the surgeons see the tonsillar tissue and the related structures in the obscure part clearer. That makes the intracapsular tonsillectomy using a CO_2 laser safer and more precise due to improved ability to preserve healthy tonsillar tissue and vaporize the infected tonsillar tissue. Moreover, surgeons can also see the bleeding area (if any) and can precisely control the bleeding by using the electric cautery or suture ligation.

CONCLUSION: Rotating the operating table 20°-30° in intracapsular tonsillectomy using a CO_2 laser helps the surgeon not only to identify the upper, lower, and the side edges of the tonsillar capsule clearer but also makes the surgery safer and easier. Suture ligation of tonsillar capsule using 3-0 vicryl helps reduce the chance of post-tonsillectomy bleeding effectively.

Keywords: innovation intracapsular tonsillectomy, CO_2 laser intracapsular tonsillectomy, CO_2 laser minimally invasive tonsillectomy

Intracapsular Tonsillectomy that preserves small amounts of the healthy tonsillar tissue has been performed since the 20th century but this technique was stopped due to arguments put forward by ear, nose and throat (ENT) surgeons. They were concerned with diseases that might still reside in the remaining tissues and cases of severe infection. Some diseases such as rheumatism and scarlet fever will still remain even after surgery.[1,2] Nevertheless, this surgery technique was brought back into use at the start of the 21st century and it has been more and more popular due to the development of surgical instruments and modern knowledge that surgery can save the healthy tonsillar tissue (about 5-10% of the tonsil).[3] It is generally known now that this new technique of surgery helps reduce post-tonsillar pain after the surgery and it helps reduce the post-tonsillectomy bleeding 3 times less than the traditional tonsillectomy.[1,4] Moreover, there is no problem in tonsil's diseases not being completely cured. The findings from research centers around the world show that this new surgical technique is as good as cutting off the tonsil like the traditional technique does; the difference is the new technique helps protect the lateral walls of the throat to remain intact because it preserves the tonsillar capsule which provides the strength to the lateral walls of the throat.

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Received: January 5, 2016
Revision received: January 8, 2016
Accepted after revision: January 20, 2016
Bangkok Med J 2016;11:6-10.
E-journal: http://www.bangkokmedjournal.com

Recently, this new intracapsular tonsillectomy has become more popular than the traditional tonsillectomy, especially in patients younger than 4 years old that have enlarged tonsils or who have sleep apnea. Moreover, children who weigh less than 15 kilograms or who are at risk of bleeding can also benefit. However, the problem of this surgical technique is that it always has obscure parts. Obscure parts are located around the tonsillar capsule which cannot easily be seen clearly if the oral cavity is in a straight position just like in general tonsil surgery. This similar issue can be solved by using a 30° endoscope to help during the operation in order to see clearer through the obscure areas. Nevertheless, using such a tool in a surgery costs a lot of money since the tool itself is expensive. Moreover, it takes a long time to have one surgery done. Given these constraints, this report is going to discuss the new technique of operation, rotating the operating bed through 20°-30°. This new technique will make the intracapsular tonsillectomy easier, cheaper, and faster and it will help the surgeon to identify the structure in the tonsilliar capsule and to preserve the healthy tonsillar tissue and to control the bleeding more effectively.

Material and Method

The data is collected from 124 patients who had intracapsular tonsillectomy using CO_2 laser from October 23, 2014 to October 23, 2015. The technique of rotating the operating table 20°-30° is used with all patients during the surgery for the surgeons to see the side edges, the upper parts, and the lower parts of the tonsillar capsule clearer and thoroughly. The CO_2 laser is used to vaporize all unwanted tonsils' tissues and vicryl 3-0 is also used to tie the outer surface of the tonsillar capsule (about 6-8 areas each side) to prevent bleeding after the surgery. After the surgery, the record of the pain score including the primary post-operative tonsillectomy bleeding and the secondary post-operative tonsillectomy bleeding of all the patients is recorded.

The patients can be discharged the following day with the follow up appointments at 1 week and 5 weeks after surgery. The results detailed below show that there is no primary and secondary post-operative bleeding. The pain score is at level 1-3 (mild pain). There is no residual and recurrent tonsil stone, no recurrent infection and no re-growth of the tonsil after the operation.

Results

A total of 124 patients aged between 3 and 70 years of age underwent CO_2 laser intracapsular tonsillectomy. The average amount of bleeding is 10 cc. In this group of patients shows neither immediate post-operative bleeding, nor delayed post-operative bleeding. None of these patients has come for readmission due to dehydration. The average of the pain score is 1-3 for all patients.

Discussion

Laser stands for light amplification by stimulated emission of radiation, and the CO_2 laser is the most used laser in otorhinolaryngology. CO_2 laser has been brought into use in the medical field since the 1970's. CO_2 laser is a laser caused by amplification and stimulation of CO_2 to release energy in the form of light. CO_2 laser is widely used in the medical field supported by well understood scientific studies and in-depth studies of medical laser and its uses. Moreover, the CO_2 is the first laser used in otorhinolaryngology. The wavelength of CO_2 laser is 10.6 microns which is the peak that the CO_2 laser has a strong affinity with water, and the tissues of the mouth and throat can absorb the CO_2 laser energy very well because this area of tissues contains 80-90% water. CO_2 laser has excellent cutting and ablating properties especially with soft tissue. When the CO_2 laser beams, it is not reflected or scattered in mucosa tissue. The absorption of the laser energy by water rapidly causes heat to increase within the tissue, which carbonizes the tissue. CO_2 laser can be set to pulsed mode or continuous wave (CW) mode. CW mode is suitable for oral cavity and oropharynx. CO_2 laser energy enters the target tissue by using the non-contact technique.

CO_2 laser intracapsular tonsillectomy will preserve the tonsillar capsule to avoid injury of the pharyngeal muscles and to keep 5-10%, attached with tonsillar capsule, of the healthy tonsillar tissue to act as a form of biological dressing. This biological dressing will protect the neck muscles from contacting the external environment such as saliva and food. It is the prevention of injury and the infection of the neck muscle wall that can reduce pain after the surgery and helps the patients to recover faster.[5]

The absence of post tonsillectomy bleeding both immediate post-operative bleeding and delayed post-operative bleeding, in patients who used CO_2 laser intracapsular tonsillectomy might occur because the surgeons preserve the tonsil tissue and tonsillar capsule along with suture ligation the tonsillar capsule using vicryl 3-0. This vicryl 3-0 will come off by itself within 3-5 weeks. This technique of tonsil surgery by removing tonsillar tissue from the outside in, where no large vessels but only small arterioles are affected greatly reduces the occurrence of delayed hemorrhage.

The rotation of operating table to the left and to the right through a range of 20°-30° during surgery allows the surgeon to see the tonsillar capsule clearer, especially in the obscure part, namely the upper pole, lower pole, and anteromedial aspect of tonsillar capsule. This allows the surgeon to vaporize infected tissue, keep the healthy tonsillar tissue, and preserve tonsillar capsule more effectively.

ISSN 2287-0237 (online)/ 2287-9674 (print)

Conclusion

Intracapsular tonsillectomy is the new technique of tonsillectomy surgery. It is a minimally invasive intracapsular tonsillectomy. It causes less pain than the traditional tonsillectomy and it significantly reduces the chance of bleeding. However, this new surgery technique is still difficult in seeing the tonsillar capsule structure thoroughly. Seeing through the tonsillar capsule will help increase the success of the operation.

Rotating the operating table about 20°-30° will help the doctors see the tonsillar tissue that is adhered to the tonsillar capsule, thus, the doctors will be able to determine whether to vaporize the infected tonsillar tissue or to preserve the tonsil tissue. The intracapsular tonsillectomy using CO_2 laser, the suture ligation of the tonsillar capsule surface area using vicryl 3-0 to control the bleeding and the use of rotating operating table 20°-30° can help surgeons perform the surgery neatly. The surgeons can save the capsule of the tonsil without cutting through the muscles beneath. The preserving of the tonsillar capsule and the suture ligation of the tonsillar capsule using vicryl 3-0 will help reduce the incidence of post tonsillectomy bleeding and maintain the strength of the side lateral walls of the throat.

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ISSN 2287-0237 (online)/ 2287-9674 (print)

Appendix (Pictures)

When using the Boyle-Davis gag to hold the mouth open in general tonsil surgery, the tongue blade handle will be attached to the edge of mayo table. In that position, the oral cavity will not be able to flip or tilt either to the left nor right and that prevents the surgeons, when doing the intracapsular tonsillectomy, from getting a clear view of the upper, lower and the side edges of the tonsillar capsule through the obscure part.

Figure 1

Figure 2

Figure 3

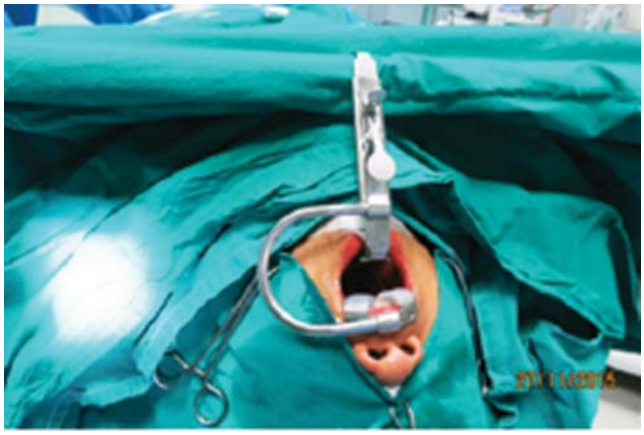

Figure 4

Figure 5

Figure 6

Figure 7

ISSN 2287-0237 (online)/ 2287-9674 (print)

Figure 8

The new technique is developed to use the rotating operating table without attaching the tongue blade handle to the table. Instead, attach it with the L-square anesthetists screen frame. One of the L-square's anesthetists screen frame will be attached to the right side of the bed, another one will be placed across the patient's body and that will be used to attach to the tongue blade handle (Figure 1-4). This technique will allow the surgeons to rotate the bed to the left and to the right and the head side of the operating table is also adjustable to a higher or lower level during the operation (Figure 5-8). Rotating the operating table through 20°-30° and being able to adjust the head side of the table up and down allows the doctors to see the upper and the lower parts of the obscure area, including the side edges of the tonsillar capsule clearly and thoroughly without (Figure 8) using 30° endoscope. (Figure 9, 10)

Figure 9

Figure 10

ISSN 2287-0237 (online)/ 2287-9674 (print)