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Transcanalicular laser dacryocystorhinostomy with and without mitomycin

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引用:Raposo A, Rodríguez MA, Guillén A, Lajara J, García-Purriños F. 丝裂霉素对经泪小管激光泪囊鼻腔造孔术的影响. 国际眼科杂志 2022;22(3):363-365

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Received: 2021-07-09 Accepted: 2021-12-20

丝裂霉素对经泪小管激光泪囊鼻腔造孔术的影响

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摘要
目的:探讨丝裂霉素对经泪小管激光泪囊鼻腔造孔术(TL-DCR)的疗效影响,并结合 PubMed 数据库 2011-2021 年发表的相关文章来阐明丝裂霉素在 TL-DCR 手术中的作用。
方法:回顾性分析 2008-01/2019-07 接受 TL-DCR 手术的 120 例患者病历资料,根据术中是否使用丝裂霉素将患者分为丝裂霉素组和非丝裂霉素组。
结果:丝裂霉素组的成功率为 71.9%,非丝裂霉素组的成功率为 71.0%。
结论:两组患者手术成功率无明显差异。2011-2021 年 PubMed 数据库中关于丝裂霉素在 TL-DCR 手术中的作用的文章仅 2 篇,且研究结果相反,因此丝裂霉素在TL-DCR 手术中的作用尚不明确。
关键词:激光;经泪小管激光泪囊鼻腔造孔术;丝裂霉素;PubMed

Abstract
• AIM: To investigate if mitomycin reduces or not the probability of developing synechiae and granulomas in transcanalicular diode laser dacryocystorhinostomy. Also, we want to clarify the usefulness of mitomycin in that procedure by searching in PubMed between 2011 and 2021.
• METHODS: A retrospective case series study of 120 transcanalicular diode laser dacryocystorhinostomy was performed from January 2008 to July 2019. Patients were divided into two groups: one group was operated on with mitomycin and the other group was operated on without mitomycin.
• RESULTS: The success rate was 71.9% in the mitomycin group and 71.0% in the non-mitomycin group.
• CONCLUSION: No statistically significant differences in the outcomes of the two groups were found. Only two opposing articles regarding the use of mitomycin in transcanalicular diode laser dacryocystorhinostomy were found in PubMed between 2011 and 2021, so the use of mitomycin is still unclear.
• KEYWORDS: laser; dacryocystorhinostomy; mitomycin; PubMed
DOI:10.3980/j.issn.1672-5123.2022.3.02

Citation: Raposo A, Rodríguez MA, Guillén A, Lajara J, García-Purriños F. Transcanalicular laser dacryocystorhinostomy with and without mitomycin. *Guoji Yanke Zazhi (Int Eye Sci)* 2022;22(3):363-365

INTRODUCTION

During the past 25 years, many surgeons have been using resources such as mitomycin (MMC) to reduce the probability of developing synechiaes and granulomas because they believed that the outcomes of transcanalicular diode laser dacryocystorhinostomy (TL-DCR) could be improved[1-3]. They placed cotton or surgical patties soaked in MMC during various minutes depending on the surgeon (from 2.5min-48h). The dose ranged from 0.02-0.5 mg/mL, at those doses, no side effects occurred[4]. We believe that the

diversity of the results, the non-objective tests used to define success or failure and the use of MMC are still a debatable subject among surgeons.

Our goal is to investigate if MMC reduces or not the probability of developing synechiae and granulomas in TL-DCR. Also, we want to clarify the usefulness of MMC in TL-DCR by searching in PubMed between 2011 and 2021.

SUBJECTS AND METHODS

A retrospective case series study was performed on patients subjected to TL-DCR at a public university hospital from January 1, 2008 to July 31, 2019. All patients were operated on by the same surgical team (AR, JL and MAR). From January 1, 2008 to February 28, 2011, the patients were operated on with MMC, and from 1, March 2011 to July 31, 2019, they were operated on without MMC. The inclusion criteria included patients who did not have nasosinusal or eye disease, patients who had a negative lacrimal syringing and patients who were operated on by the same surgical team. All patients were evaluated by the otorhinolaryngologist surgeon (AR) prior to surgery to verify the correct endonasal approach. The patients who had severe septal deviation (who did not have a correct endonasal approach) were placed on a surgical waiting list for simultaneous septoplasty and TL-DCR.

Children under 18, DCR relapses (external, endoscopic or transcanalicular), nasosinusal or eye disease, follow-up periods less than 12mo and simultaneous bilateral DCR were excluded. All the patients signed informed consent forms for TL-DCR. The trial was approved by the Ethics Committee in accordance with Declaration of Helsinki.

The patients were operated on under locoregional anaesthesia except for TL-DCR with septoplasties. In such cases, they were operated on under general anaesthesia. The upper canaliculus was dilatated and a silicon fiber-optic with a diameter of 0.6 mm was used. We prefer to dilate the upper canaliculus, so we prevent to damage the mean canaliculus (lower) in that procedure. The osteotomy was performed by laser diode (15W). Surgical patties soaked in 1 mL of 0.04 % MMC in distilled water were placed over the osteotomy for 5min after TL-DCR in the MMC group. No patties were placed in the non-MMC group. The bicanalicular silicone tube was removed at 12wk after TL-DCR in the two groups. All patients were discharged 4h after the surgery. Tobramycin-dexamethasone eye drops and fluticasone furoate nasal spray were prescribed as postsurgical treatment.

Endoscopic assessments at 1, 3, 6 and 12mo were performed in this study. The surgery was considered a "success" if the lacrimal syringing was positive 12mo postoperatively. The lacrimal syringing is an objective test where we can check the patency of the lacrimal pathways when normal saline is injected in the lower canaliculus. The Chi-square test with Yates correlation was used to compare the success rates between the two groups.

RESULTS

A total of 120 TL-DCR surgeries were performed (120 patients) during the past 10 years; 89 patients were operated on with MMC and 31 patients were operated on without MMC.

Table 1 Success (TL-DCR) with and without MMC

Results	With MMC	Without MMC	*RR*	95%*CI*
Success	64	22	1.01	0.78-1.31
Fail	25	9		

TL-DCR: Transcanalicular laser dacryocystorhinostomy; MMC: Mitomycin; *CI*: Confidence interval; *RR*: Relative risk.

Table 2 Success (TL-DCR) depends on gender and the use of MMC (with or without MMC)

Parameters	Female	Male	*RR*	95%*CI*
With MMC			0.96	0.72-1.28
Success	47	17		
Fail	19	6		
Without MMC			1.11	0.68-1.79
Success	14	8		
Fail	5	4		

TL-DCR: Transcanalicular laser dacryocystorhinostomy; MMC: Mitomycin; *CI*: Confidence interval; *RR*: Relative risk.

In the MMC group, 64 patients were operated on successfully; therefore, the success rate was 71.9%. A total of 22 patients were operated on successfully in the non-MMC group, thus the outcome in the non-MMC group was 71.0%. No statistically significant difference was found ($P = 0.92$) (Table 1).

Regarding gender, 66 females (74.2%) and 23 males (25.8%) were operated on with MMC, while 19 females (61.3%) and 12 males (38.7%) were operated on without MMC. Thus, 47 females and 17 males were successfully operated on with MMC, while 14 females and 8 males were successfully operated on without MMC (Table 2).

The success rate was 71.2% in females operated on with MMC and 73.9% in males operated on MMC. No statistically significant difference was found ($P=0.81$). The outcome was 73.6% in females operated on without MMC and 66.7% in males operated on without MMC. No statistically significant difference was found ($P=0.98$). Sixty-eight patients 50 years of age or older were operated on with MMC, and 21 patients younger than 50 years of age were operated on with MMC. In contrast, 20 patients 50 years of age or older were operated on without MMC, and 11 patients younger than 50 years of age were operated on without MMC. The success rate was 72.0% in patients who were at least 50 years old, and 71.4% in patients younger than 50 in the MMC group. No statistically significant difference was found ($P=0.95$). The outcome was 70% in patients who were at least 50 years old and 72.7% in patients younger than 50 in the non-MMC group. No statistically significant difference was found ($P = 0.79$) (Table 3).

Three patients treated with MMC had severe septal deviations, thus septoplasty was required before performing TL-DCR. Two of these patients were operated on successfully. The success rate was 66.6%. No statistically significant difference was found ($P = 0.53$) between patients operated on with septoplasty or without septoplasty. There were no other nasal anatomical variations that limited surgery. One patient who was operated on without MMC required septoplasty before

Table 3 Success (TL-DCR) depends on age and the use of MMC

Parameters	≥50	<50	*RR*	95%*CI*
With MMC			1.01	0.74-1.37
Success	49	15		
Fail	19	6		
Without MMC			0.96	0.61-1.53
Success	14	8		
Fail	6	3		

TL-DCR: Transcanalicular laser dacryocystorhinostomy; MMC: Mitomycin; *CI*: Confidence interval; *RR*: Relative risk.

TL-DCR was performed. The patient was operated on successfully, and the outcome was 100%. There were no other nasal anatomical variations that limited surgery.

DISCUSSION

This critical review has aimed to clarify many surgical concepts relevant to TL-DCR. During the first two decades of the 21st century, many surgeons believed that MMC was useful for TL-DCR, so we began to use MMC in 2008 because the medical literature advised it[2-3]. In 2011, Tirakunwichcha *et al*[5] did not observe any statistically significant differences between the MMC groups and non MMC groups regarding endonasal endoscopic DCR, so we stopped using MMC from 2011 to 2019 regarding Tirakunwichcha *et al*[5]. After performing 31 TL-DCR without MMC, we found no statistically significant differences between the success rates in the groups with MMC and without MMC. Hence, we believe that MMC is not useful in TL-DCR. The latest trend has been to avoid using MMC in TL-DCR because Ozsutcu *et al*[6] and Kar *et al*[7] did not observe any statistically significant differences between the MMC groups and non MMC groups. Only these two opposing articles regarding the use of MMC were found between 2011 and 2021 in PubMed using the key words "mitomycin" and "laser dacryocystorhinostomy" together[8].

We performed septoplasty and TL-DCR simultaneously only in cases where an endonasal approach limited the use of TL-DCR. Another published study showed that the outcome improved when simultaneous septoplasty and TL-DCR were avoided in cases of light or moderate septal deviation. The increase in inflammatory mediators influenced the formation of scarring from the laser used for osteotomy[9]. The surgical team had extensive experience before beginning the study in 2008; therefore, learning bias was avoided.

We have avoided subjective bias due to the use of the lacrimal syringing. We considered it a "success" when the lacrimal syringing was positive 12mo postoperatively. All patients tested positive in the first and third postoperative months. After the third postoperative month, the success rate decreased until the sixth month. From the 6th to the 12th month, the results did not change. All patients who were classified as a "success" were discharged. Bilateral TL-DCR were excluded because these patients were operated successfully on the left or right lacrimal pathway but the other side were failed, and the difference between the number of patients undergone bilateral TL-DCR in the two groups was significant. Regarding the success rate of bilateral TL-DCR, no statistically significant difference was found in these groups. We are aware that external or endonasal DCR achieve better results than TL-DCR. Medical literature shows a wide range of external DCR success rate (70%-99%), endonasal DCR success rate (63%-91%) and TL-DCR success rate (58%-97%). However, TL-DCR has reported lower complication rate than the others[10-11]. No complication was reported in our study.

In conclusion, MMC does not seem to influence the outcome of TL-DCR. Only two opposing articles regarding the use of MMC were found between 2011 and 2021 in PubMed using the key words "mitomycin" and "laser dacryocystorhinostomy" together, so the use of MMC is still unclear.

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