

# Results and complications of external dacryocystorhinostomy surgery at a teaching hospital in Iran

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## ABSTRACT

**Objectives:** To conduct a survey of outcomes, failure frequency rates, and other complications of dacryocystorhinostomy (DCR) at a teaching hospital in Iran.

**Methods:** In this outcome study, we survey the results of DCR in 187 consecutive chronic dacryocystitis patients operated at the Eye Department of Yazd Medical University, Iran from March 2001 to April 2003. We investigated the results and probable complications of this surgical procedure.

**Results:** Our data shows that the success rate of the operation was 90.4% with a confidence interval of 95% (86.3-94.5). The success rate was 91% in female and

89.3% in males ( $p=0.543$ ). The failure rate was 9.6%. According to the methods used in this study, the success rate of the external method with silastic intubation was 96.3% and 88% without. These differences, however, were not statistically significant ( $p=0.08$ ). The most frequent and important complication of DCR was failure and recurrence of epiphora or purulent discharge (9.6%). The less frequent complications included scar formation (8.6%), wound infection (5.3%) and granuloma formation (3.2%). There were no complications during the operation.

**Conclusion:** External DCR is an easy technique with a success rate of more than 90%, with few complications.

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**E**piphora and purulent discharge are the most frequent signs of nasolacrimal duct obstruction,<sup>1-4</sup> comprising 10-20% of eye clinic patients.<sup>2</sup> The most frequent cause of nasolacrimal ductal obstruction (NLDO) is idiopathic, followed by trauma or previous surgery.<sup>1,3,4</sup> The classic dacryocystorhinostomy operation with the best results is the Totis technique that explains the tear sac excretion to the nasal cavity.<sup>5</sup> Revision of this procedure over the years now results in a more than 90% success rate.<sup>6</sup> The improvement of the technique has made possible the use of local anesthesia,<sup>7,8</sup> and as an outpatient procedure.<sup>9</sup> The aim of DCR is to establish an epithelium covered path between the tear sac and

the nasal cavity (medial meatus) for bypassing the nasolacrimal obstruction,<sup>10</sup> and to reestablish the tear sac drainage into the nasal cavity.<sup>11</sup> The failure rate of the DCR operation is 5-10%, occurring months or even years after the operation, with clinical presentations such as dacryocystitis or epiphora.<sup>10</sup> Although it is generally possible to detect the reasons of failure, sometimes it is not apparent before reoperation.<sup>10</sup> According to operation techniques, the success rates by transnasal laser assisted- DCR are 62-85%,<sup>12-15</sup> transnasal endoscopies 75%,<sup>15</sup> and external DCR approach 76-98.5%.<sup>16-20</sup> The most important complication of the DCR operation was recurrence of epiphora, the rate

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of which in different studies has been reported to be between 0.5-25%.<sup>20-27</sup> We conducted this study to reveal the results and complications of a standard external DCR operation in the Yazd province of Iran.

**Methods.** This descriptive, cross-sectional outcome study included all patients (206 consecutive cases) admitted and undergoing external DCR technique at the Eye Department of Yazd Medical University, Iran from March 2001 to April 2003. Data were collected from the patients' files by a questionnaire. The patients were followed up for 3 months postoperation.

The results were analyzed by the SPSS software program, using Chi-square, and Fisher exact test. The study group included chronic dacryocystitis patients that were admitted to the hospital for external DCR operation. All of the patients had general anesthesia. The site of incision was 4 mm medial to the medial canthal angle, and after orbicularis muscle and periosteal dissection, a punch was used for osteotomy. The anterior flaps were sutured by 6-0 coated Vicryl (polyglactin 910) with an s-14 spatula needle. The subcutaneous tissue and skin was sutured by 6-0 Vicryl and 6-0 silk sutures. The patients took chloramphenicol eye drops for one week, and the skin sutures were removed after 5-7 days. Operations were performed by 3 surgeons with the same technique and follow up. At the end of 2 weeks, the nasolacrimal ducts of all patients were irrigated for patency control. The qualitative variables of study included age, gender, and history of facial or nasal trauma, cause of dacryocystitis, operation technique, location, intra or post complications and operative results, while the quantitative variable was age. Nineteen cases were excluded from the study due to insufficient information or unavailable for follow up. The patients were asked about satisfaction, signs and symptoms, and other side effects. An ophthalmologist examined patients with any complications or extended symptoms. The range of postoperation follow up of patients was 3 months - 2 years. Total success rate of operation included complete resolution of epiphora and purulent discharge without any complications, relative success rate was symptoms release with occasional epiphora during special conditions and relative satisfaction, and recurrence of epiphora or purulent discharge were considered as failure of treatment.

**Results.** Of the 187 patients in this study, 29.4% were male and 70.6% were female. The mean age of the patients was  $42.4 \pm 16.1$  years, 12.6% were villagers, while the rest lived in the city. The causes of dacryocystitis were as follows: idiopathic (93%), traumatic (4.3%), congenital (1%), secondary to sinusitis

(1%) and iatrogenic (0.53%). The total success rate of surgery was 90.4% with a confidence interval (CI) of 95%. The complications rate was 17.1%, consisting of wound infection, scar formation and granuloma formation (**Table 1**). The success rate in gender was relatively equal. Also, the complications rate in gender was the same (**Table 1**). According to age factor, the success rate in the middle aged group (30-59 years) was slightly more than the other 2 groups, but this was not significant, also, there was no significant relationship between the complications rate and age factor (**Table 2**). The success rate in the external method with silastic intubations was 96.3%, while in cases without silastic tube was 88.4%. This difference was not significant. The rate of complications in both of the external methods was almost the same, such that the rate of wound infection was slightly more in the external method with tube and the rate of scar formation was slightly more in the external method without tube (**Table 3**). Of the 169 successful external DCR cases, 149 cases (88.2%) had complete success and 11.8% had relative success. There were no significant complications during the operation.

**Discussion.** The external DCR approach is an effective and successful technique for nasolacrimal duct obstruction (NLDO) surgery.<sup>1,5,28,29</sup> Different studies report the success rate of the external DCR approach 78-98.5%.<sup>1,12,18,30,31</sup> In the Delaney et al study<sup>31</sup> the success rate of the operation with a follow up of 36 months was 84%. In the Yasar study<sup>30</sup> between 1994-1998 on 79 patients, the success rate of the external method was 89.8%, while the endoscopic endonasal method was 88.2%. In another study by Emmerich,<sup>1</sup> the success rate was 85% during 35.6 months follow up. In the Martikainen<sup>12</sup> survey in Finland, 1990, the success rate of the external method was 91% with one year follow up, while the success rate of the endonasal laser-assisted technique was 63%. In the Adenis<sup>18</sup> search in France on 165 patients, the success rate of DCR was 88% in traumatic cases and 87% in all etiologic cases. The general success rate in our study was 90.4%. Of the 187 patients, the treatment failed in 18 cases (9.6%), similar to the other studies results. In the Emmerich<sup>1</sup> study in Germany, 92% of the nasolacrimal duct obstruction etiology was idiopathic, 7% traumatic and 1% secondary to other factors. In the study by Adenis<sup>18</sup> in France, 25 of the 165 cases (15%) were due to trauma, of which 73% were male and 27% female, while the idiopathic factor was more common in female (83%) than male. In our study, the causes of NLDO were idiopathic 92.5%, traumatic 4.3% and 3.3% due to other causes. The frequency of idiopathic causes in our study was similar to the Emmerich survey. Generally, dacryocystitis and NLDO

Table 1 - Rate of success and complications of dacryocystorhinostomy (DCR) in relation to gender.

Gender	n	Success (%)	Number of complications (%)		
			Wound infections	Scar formation	Granuloma formation
Male (n=55)	49	(89.1)	4 (7.3)	2 (3.6)	2 (3.6)
Female (n=132)	120	(91)	6 (4.5)	14 (10.6)	4 (3)
<b>Total (n=187)</b>	<b>169</b>	<b>(90.4)</b>	<b>10 (5.3)</b>	<b>16 (8.6)</b>	<b>6 (3.2)</b>
<i>p</i> -value		0.706		0.543*	

Table 2 - Rate of success and complications of dacryocystorhinostomy in relation to age.

Age (years)	n	Success (%)	Number of complications (%)		
			Wound infections	Scar formation	Granuloma formation
<30 (n=69)	61	(88.4)	10 (14.5)	6 (8.7)	0
30-59 (n=82)	76	(92.7)	0	8 (9.8)	6 (7.3)
>60 (n=36)	32	(88.9)	0	2 (5.6)	0
<i>p</i> -value*		0.62		0.079	

\**p*-value is determined according to the presence or absence of complications, not by the types of complications

Table 3 - Rate of success and complications of dacryocystorhinostomy in relation to the type of surgery.

Type of operation	n	Success (%)	Number of complications (%)		
			Wound infections	Scar formation	Granuloma formation
External with tube (n=54)	52	(96.3)	6 (11.1)	2 (3.7)	2 (3.7)
External without tube (n=133)	117	(88)	4 (3)	14 (10.5)	4 (3)
<i>p</i> -value*		0.08		0.079	

frequency is more common in female.<sup>3,10,19,29,30,32,35</sup> In a study performed in Spain over 115 patients, 85 cases (73.9%) were female and 30 (26.1%) were male, was similar to our study. In the study by Yasar et al,<sup>30</sup> over 79 patients, 66 cases (83.5%) were female and only 13 cases (16.5%) were male. The ratio of female to male was >5 times. In studies performed in various countries, 65-75% were female and 25-35% male.<sup>21,22,24,34</sup> In our study, 132 cases were female (70.6%) and 55 cases were male (29.4%), thus, the ratio of female to male was more than twice in this study. The success rate of surgery in male was 89.1%, while in female was 90.1%. In our study, the failure of surgery was 18 cases (9.6%), which is similar to other studies.<sup>20-27</sup> The highest success rate of patients was in the 30-59 years age group (92.9%) then, the older was ≥60 years age group (88.9%). The lowest rate of success was in the less than 30 years age group (88.6%). Bleeding is another complication that occurs in 4.6% of patients intra or postoperatively. If we use prophylactic antibiotics, the rate of wound infection is 2%, but in cases that antibiotics are not prescribed, the rate of infection is 8%.<sup>4</sup> In the study by Tarbert,<sup>20</sup> bleeding occurred in 3.9% of cases and there was scar formation in 2.6% of cases. In our study, there was no intraoperative bleeding (Table 1). Thus, in this study, the most frequent complication after failure was scar in female and wound infection in male. In this study 18% of female and 14.5% of male suffered from complications. The most frequent rate of complications was in the <30 years age group (23.2%), while the least frequent rate of complications was in the >60 years age group (5.6%). The rate of complications in the 30-59 years age group was 17%. In this study, age was inversely related to the rate of postoperative complications. In this study, the success rate in external DCR technique and silastic intubations (54 cases) was 8.3% more than the group with external DCR technique without silastic intubations (133 cases). The most frequent rate of wound infection (11.1%) was seen in the external technique with silastic intubations, while the highest rate of scar formation was seen in the external method without intubation (10.6%). The rate of granuloma formation was 0.7% more in the external method with intubation.

In conclusion, the success rate of the standard external DCR operation was more than 90%. We recommend this method as it is relatively easy, less expensive with good satisfaction.

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