The effect of peri-operative prophylactic systemic antibiotics on the post-operative infection rate following external dacryocystorhinostomy: a systematic review and meta-analysis

Deep Sarode[1], Alasdair Simpson[1], Kevin Crofts[1]

[1]Gartnavel General Hospital, NHS Greater Glasgow & Clyde

Introduction

There remains controversy surrounding the use of prophylactic systemic antibiotics for external dacryocystorhinostomy (EX-DCR). Post-operative infection is a known complication and has been associated with failure of EX-DCR. However, there is no clear consensus as to whether the use of prophylactic systemic antibiotics reduces the post-operative infection rate.

Aim

To critically evaluate the evidence comparing post-operative infection rates following EX-DCR with and without the use of any peri-operative prophylactic systemic antibiotic and to thus determine whether systemic antibiotic prophylaxis is beneficial in EX-DCR.

Methods

A literature search of the databases of MEDLINE, Embase, and CENTRAL was performed. The date of last search was 10/04/2020. Risk of bias was assessed using the ROBINS-I tool. Chi^2 and I^2 statistics were calculated to determine the presence and extent of statistical heterogeneity. Study selection, data extraction and risk of bias scoring were performed independently by two authors in concordance with the PRISMA statement.

The primary outcome was post-operative infection rate. The secondary outcomes were surgical success rate and post-operative haemorrhage rate.

Included Studies

Eligibility criteria	
Participants	Patients undergoing external dacryocystorhinostomy
Intervention	Any systemic peri-operative antibiotic regimen
Comparator	Absence of systemic peri-operative antibiotic use
Co-interventions	Presence of co-interventions did not eligibility
Study design	Any randomised or non-randomised studies Any comparative or non-comparative study

1717 citations identified

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1436 titles and/or abstracts screened

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Full text of **38** citations assessed

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9 studies included in systematic review

3 comparative studies
6 non-comparative studies

Comparative studies

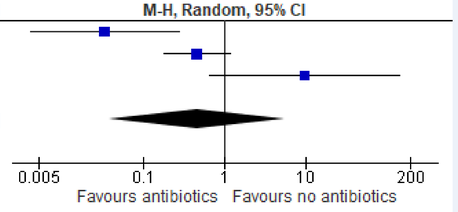
Three non-randomised studies (871 EX-DCR procedures in 743 patients) were included for meta-analysis. The average age of patients was 52.9 years (range: 2-95 years).

The overall post-operative infection rate following EX-DCR was 3.1% (27/871). Prophylactic systemic antibiotics were used in 477 (55%) and not used in 394 (45%) procedures. The post-operative infection rate was 1.7% (8/477) following the use of prophylactic systemic antibiotics and 4.8% (19/394) following no use of prophylactic systemic antibiotics.

Meta-analysis showed no statistically significant difference in outcomes between the two groups (p=0.55; RR=0.46; 95%CI=0.04-5.75). Substantial interstudy statistical heterogeneity was present (I^2=82%).

	Antibiotics		No antibiotics			Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI
Vardy 2000	1	254	5	41	32.3%	0.03 [0.00, 0.27]
Walland 1994	6	208	13	205	39.5%	0.45 [0.18, 1.17]
Yazici 2002	1	15	1	148	28.2%	9.87 [0.65, 149.85]
Total (95% CI)		**477**		**394**	**100.0%**	**0.46 [0.04, 5.75]**
Total events	8		19			

Heterogeneity: Tau^2 = 3.97; Chi^2 = 10.86, df = 2 (P = 0.004); I^2 = 82%
Test for overall effect: Z = 0.60 (P = 0.55)



Single-arm studies

Antibiotics only

Two studies included only patients who had received prophylactic systemic antibiotics. The outcome data is shown in the table below. The post-operative infection rate ranged between 0 – 0.3%.

Author	Post-operative infection rate	Success rate	Post-operative haemorrhage rate
Sheth et al. (2019)	1 / 311 (0.3%)	302 / 311 (97.1%)	7 / 311 (2.3%)
Quaranto-Leoni et al. (2018)	0 / 46 (0%)	43 / 46 (93.5%)	2 / 48 (4.2%)

No antibiotics only

Four studies included only patients who had not received prophylactic systemic antibiotics. The outcome data is shown below. The post-operative infection rate ranged between 0 – 4.1%.

Author	Post-operative infection rate	Success rate	Post-operative haemorrhage rate
Wladis et al. (2019)	0 / 152 (0%)	-	-
Dulku et al. (2012)	1 / 82 (1.2%)	73 / 78 (93.6%)	-
Tsirbas et al. (2000)	12 / 293 (4.1%)	268 / 293 (91.5%)	11 / 293 (3.8%)
Cho et al. (2018)	0 / 17 (0%)	15 / 17 (88.2%)	0 / 17 (0%)

Conclusion

Our review and meta-analysis did not demonstrate a clear additional advantage of prophylactic systemic antibiotics. However, the currently available evidence is insufficient to draw a firm conclusion. A high-quality well-powered prospective multicentre RCT is needed to further clarify the benefit of prophylactic systemic antibiotic therapy.