Expert Review of Vaccines

ISSN: 1476-0584 (Print) 1744-8395 (Online) Journal homepage: informahealthcare.com/journals/ierv20

Present and future cholera vaccines

Lisa Olsson & Per-Arne Parment

To cite this article: Lisa Olsson & Per-Arne Parment (2006) Present and future cholera vaccines, Expert Review of Vaccines, 5:6, 751-752, DOI: 10.1586/14760584.5.6.751

To link to this article: https://doi.org/10.1586/14760584.5.6.751

Published online: 09 Jan 2014.

Submit your article to this journal

Article views: 616

View related articles

Full Terms & Conditions of access and use can be found at
https://informahealthcare.com/action/journalInformation?journalCode=ierv20

For reprint orders, please contact:
reprints@future-drugs.com

Present and future cholera vaccines

Lisa Olsson and Per-Arne Parment[†]

[†]*Author for correspondence*
SBL Vaccin AB, SE-105 21 Stockholm, Sweden; Tel.: +46 8735 1474; Fax: +46 8827 304; per-arne.parment@sblvaccines.se

Expert Rev. Vaccines 5(6), 751–752 (2006)

In *Expert Review of Vaccines* 5(4), 483–494 (2006), Edward T Ryan and colleagues give an overview of live-attenuated cholera vaccines [1]. However, when referring to the killed whole-cell/cholera toxin B-subunit (WC-BS) vaccine, they give an incomplete picture of that vaccine, which could make vaccinators more reluctant to use this, the only cholera vaccine that is available commercially, thus endangering the lives of cholera-exposed individuals.

When the WC-BS vaccine was studied in Bangladesh, the short-term protection (6 months) against cholera was 85% for the WC-BS vaccine and for adults and children over 6 years of age, the protections was as good after two doses as after three [2,3]. The duration of protection after oral killed WC-BS vaccine in Bangladesh is shown in TABLE 1.

The protective efficacy of the oral killed whole-cell/recombinant cholera toxin B-subunit (WC-rBS) cholera vaccine has been studied in two studies in Peru. One was a field study in 1563 adult military personnel, showing 86% protective efficacy over the 5 month observation period [4]. The other study is that mentioned by Ryan and colleagues, although they do not provide the reference. The aim of this study was to determine the protective efficacy of the WC-rBS against El Tor cholera among Peruvian children and adults in a randomized, double-blind manner [5]. All subjects, including the children, received two doses of WC-rBS vaccine followed by a third booster dose approximately 1 year later. During the first year, no protection was demonstrated. A number of issues in the methodology and conduct of this study were identified in a monitoring report during the first year of surveillance. However, these issues were resolved by the time of monitoring during the second year when a 60.5% protective efficacy was found [6,101].

When mentioning a recent field trial in Mozambique, Ryan and colleagues stated that protective efficacy was 78% during the 6 months after receiving one or more doses; however, when the vaccine was taken in two doses according to recommendation, a protective efficacy of 84% was observed [7].

An additional advantage with the WC-rBS vaccine is the immunological cross-reactivity between the B-subunit of the cholera toxin and the heat-labile toxin of enterotoxigenic *Escherichia coli* (LT-ETEC), resulting in the fact that the WC-rBS vaccine induces a short-term (3 month) cross-protection (60–65%) against LT-ETEC-induced diarrhea [8–10]. In a recent study, such cross-protection was not shown for the live oral attenuated cholera CVD 103-HgR vaccine (Orachol/Mutacol) [11].

The oral WC-rBS cholera vaccine (Dukoral®, SBL, Vaccin AB, Sweden) may not be the final, ideal solution to the cholera problem but it is the vaccine that is available today and it has stopped cholera outbreaks on the French island of Mayotte [12] and in camps for Sudanese refugees [13,14]. The producer of the live CVD 103-HgR cholera vaccine, Berna Biotech (Switzerland), has stopped its production of that vaccine and is now the agent for the WC-rBS cholera vaccine (Dukoral) in Switzerland. We will encourage all research (our own and others) to create a cheap, simple cholera vaccine that induces durable protection. However, we also encourage the use of the present vaccine to save lives and resources in cholera-affected areas until better vaccines are available.

Table 1. The efficacy against cholera after three doses of killed whole-cell/B-subunit oral cholera vaccine in Bangladesh.

Period after vaccination	Children <6 years	Adults and children >6 years
6 months	100%	76%
Year 1	44%	76%
Year 2	33%	60%
Year 3	<0	45%

References

1 Ryan ET, Calderwood SB, Qadri F. Live attenuated oral cholera vaccines. *Expert Rev Vaccines* 5(4), 483–494 (2006).

2 Clemens JD, Sack DA, Harris J *et al.* Field trial of cholera vaccines in Bangladesh. *Lancet* 2, 124–127 (1986).

3 Van Loon FP, Clemens JD, Chakraborty J *et al.* Field trial of inactivated oral cholera vaccines in Bangladesh: results from 5 years of follow-up. *Vaccine* 14, 162–166 (1996).

4 Sanchez Jl, Vasquez B, Begue RE *et al.* Protective efficacy of oral whole-cell/recombinant-B-subunit cholera vaccines in Peruvian military recruits. *Lancet* 344, 1273–1276 (1994).

5 Taylor DN, Cardenas V, Sanchez JL *et al.* Two-year study of the protective efficacy of the oral whole cell puls recombinant B subunit cholera vaccine in Peru. *J. Infect. Dis.* 181, 1667–1673 (2000).

 © 2006 Future Drugs Ltd ISSN 1476-0584

6 Clemens JD, Sack DA, Ivanoff B. Misleading negative findings in a field trial of killed oral cholera vaccine in Peru. *J. Infect. Dis.* 185, 1306–1308 (2001).

7 Lucas MES, Deen JL, von Seilein L *et al.* Effectiveness of mass oral cholera vaccination in Beira, Mozambique. *N. Eng. J. Med.* 352, 757–767 (2005).

8 Clemens JD, Sack DA, Harris JR *et al.* Cross-protection by B subunit whole cell cholera vaccine against diarrhea associated with heatlabile toxin-producing enterotoxigenic *Escherichia coli*: result of a large-scale field trial. *J. Infect. Dis.* 158, 1285–1289 (1988).

9 Peltola H, Siitonen A, Kyronseppa H *et al.* Prevention of travelers' diarrhea by oral B-subunit/whole-cell cholera vaccine. *Lancet* 338, 1285–1289 (1991).

10 Scerpella EG, Sanchez JL, Mathewson JJ 3rd *et al.* Safety, immunogenicity, and protective efficacy of the whole-cell/recombinant B subunit (WC/rBS) oral cholera vaccine against travelers' diarrhea. *J. Travel Med.* 2, 22–27 (1995).

11 Leyten EM, Soonawala D, Schultsz C *et al.* Analysis of efficacy of CVD 103-HgR live oral cholera vaccine against all-cause travellers' diarrhoea in a randomised, double-blind, placebo-controlled study. *Vaccine* 23, 5120–5126 (2005).

12 Harris J. Vaccination campaign against cholera in Mayotte. Aventis Pasteur, internal memo. May 14 (2001).

13 Legros D, Paquet C, Perea W *et al.* Mass vaccination with a two-dose oral cholera vaccine in a refugee camp. *Bull. World Health Organ.* 77, 837–842 (1999).

14 Dorlencourt F, Legros D, Paquet C, Neira M, Ivanoff B, Le Saout E. Effectiveness of mass vaccination with WC/rBS cholera vaccine during an epidemic in Adjumani district, Uganda. *Bull. World Health Organ.* 77, 949–950 (1999).

Website

101 EMEA. EPAR, Scientific discussion (2004) www.emea.eu.int/humandocs/EPAR/dukoral/dukoral.htm

Affiliations

- *Lisa Olsson, MSci*
  SBL Vaccin AB, SE-105 21 Stockholm, Sweden
  Tel.: +46 8735 1297
  Fax: +46 8827 304
  lisa.olsson@sblvaccines.se
- *Per-Arne Parment, MD, PhD, DTM&H*
  SBL Vaccin AB, SE-105 21 Stockholm, Sweden
  Tel.: +46 8735 1474
  Fax: +46 8827 304
  per-arne.parment@sblvaccines.se