WHO recommendation on choice of an antiseptic agent and its method of application for skin preparation prior to caesarean section

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Recommendation

The choice of an antiseptic agent and its method of application for skin preparation prior to caesarean section should be based primarily on the clinician’s experience with that particular antiseptic agent and method of application, its cost and local availability.

(Low - quality evidence, conditional recommendation)

Publication history

First published: September 2015

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Assessed as up-to-date: September 2015

Remarks

- Skin preparation is a vital part of the overall care that must be given to women undergoing surgery, to prevent surgical site infections before caesarean section. However, there is no strong evidence to recommend the use of one specific antiseptic agent over another.
- Maternal allergy to the preparation must be excluded prior to surgery.
- A standard preoperative skin preparation technique that is appropriate for the intended skin incision must be followed.

Background

Bacterial infections during labour and the puerperium are among the leading causes of maternal mortality worldwide, accounting for about one tenth of the global burden of maternal deaths.(1, 2) While the number of deaths arising from these infections has decreased considerably in high-income settings, the situation has not improved in resource-limited settings. Most of the estimated 75,000 maternal deaths occurring worldwide yearly as a result of infections are recorded in low-income countries.(3) Although the reported incidence in high-income countries is relatively low (between 0.1 and 0.6 per 1000 births), it is nonetheless an important direct cause of maternal mortality.(3, 4)

Apart from deaths and acute morbidities associated with infections during or following childbirth, long-term disabilities such as chronic pelvic pain, fallopian tube blockage and secondary infertility can also occur. Maternal infections around childbirth also have a considerable impact on newborn mortality, and an estimated 1 million newborn deaths are associated with such infections annually.(5, 6) In addition, infection-
related morbidities and prolonged hospitalization can interfere with mother–infant bonding in the first days after birth.

Methods
The recommendation was developed using standardized operating procedures in accordance with the process described in the “WHO handbook for guideline development”, guided by the GRADE approach.(7) Outcomes used for this recommendation were aligned with the prioritized outcomes from the WHO recommendations on prevention and treatment of maternal peripartum infections (2015).(8) A Cochrane review was conducted on the comparative effectiveness of different methods of application of antiseptic agents (e.g. scrub, paint, drape).(9) In the review, randomized controlled trials relevant to the key question were screened by review authors, and data on relevant outcomes and comparisons were extracted. Evidence profiles (in the form of GRADE tables) were prepared for comparisons of interest, including the assessment and judgments for each outcome, and the estimated risks.

WHO convened a Guideline Development Group (GDG) meeting on recommendations on prevention and treatment of maternal peripartum infections in September 2015, where this recommendation was developed. The GDG comprised of a group of independent experts, who used the evidence profiles to assess evidence on effects on the pre-specified outcomes. GDG members discussed the balance between desirable and undesirable effects, overall quality of supporting evidence, values and preferences of stakeholders, resource requirements, cost-effectiveness, acceptability, feasibility and equity, to formulate the recommendation. Remarks were added to clarify the recommendation, and aid implementation.

Recommendation question
For this recommendation, we aimed to answer the following questions:

- Among pregnant women undergoing caesarean delivery (P), is the use of a particular antiseptic agent for preoperative skin preparation (I), compared with other antiseptic agent(s) (C), more effective in preventing post-caesarean infectious morbidities (O)?
- Among pregnant women undergoing caesarean delivery (P), is the use of a particular method of antiseptic application for preoperative skin preparation (I), compared with other methods of antiseptic application (C), more effective in preventing post-caesarean infectious morbidities (O)?

Evidence Summary
Evidence for the comparative effectiveness of different methods of application of antiseptic agents (e.g. scrub, paint, drape) was extracted from a Cochrane systematic review of six trials including 1522 women.(9) For the comparison of the use of drape versus no drape (where one trial used iodine and other used chlorhexidine), two trials conducted in Denmark and South Africa included 1294 women undergoing elective or emergency caesarean section.

Evidence on the comparative effectiveness of different antiseptic agents (e.g. alcohol, povidoneiodine) for skin preparation prior to caesarean section was extracted from the same Cochrane systematic review with data from four small trials (194 women).(9) Three of these trials were conducted in the USA, and one in France. Trials tested different forms and concentrations of antiseptics agents. For each comparison only one trial of small sample size contributed data.

The included trials did not report on many critical outcomes: severe maternal infectious morbidity, maternal death, side-effects, maternal satisfaction, neonatal infection or severe neonatal morbidity.

Comparison of different antiseptic preparations (EB 15a–15c)
Alcohol scrub plus iodophor drape versus iodophor scrub (1 trial, 79 women)

- One trial compared a one-minute scrub with 70% isoprophyl alcohol followed by application of iodophor-impregnated adhesive film in the experimental group, with a five-minute iodophor scrub followed by application of iodophor solution in the control group.
- No significant difference between groups was reported in the incidence of endometritis (RR 1.62, 95% CI 0.29 to 9.16).
- The trial reported no wound infection in either group.

Chlorhexidine 0.5% versus 70% alcohol plus iodophor drape (IOBAN 2) (1 trial, 22 women)

- This trial reported only on neonatal outcomes and did not contribute any data to any of the comparisons included in the systematic review. Cord blood iodine concentration was significantly higher in the iodine group (18.38 ± 20.34 versus 6.44 ± 0.66 ?g/100 ml, P < 0.05) than in the alcohol plus iodophor drape group. There was no significant difference in neonatal 48-hour urine iodine excretion and thyroid-stimulating hormone levels at five days.

Parachlorometaxylenol plus iodine versus iodine alone (1 trial, 50 women)

- One trial compared a five-minute scrub with parachlorometaxylenol followed by povidone-iodine scrub and normal saline irrigation of the pelvis and subcutaneous tissue at uterine closure and fascial closure with povidone-iodine surgical scrub (7.5%) followed by povidone-iodine (10%) and normal saline irrigation of the pelvis and subcutaneous tissue at uterine and fascial closure.
- There was no significant difference between groups in the incidence of endometritis (RR 0.88, 95% CI 0.56 to 1.38) or wound infection (RR 0.33, 95% CI 0.04 to 2.99).

Chlorhexidine gluconate versus povidone-iodine (1 trial, 60 women)

- There was no significant difference between groups for wound infection at two weeks after birth (RR 2.10, 95% CI 0.20 to 21.42), although the chlorhexidine gluconate group had significantly reduced bacterial growth at 18 hours after caesarean section (RR 0.23, 95% CI 0.07 to 0.70).

Methods of application: drape versus no drape (EB Tables 15d–15e)

- Two trials compared drape with no drape using different methods for preoperative skin disinfection. Incisional plastic drape was applied to the skin after preoperative skin disinfection. Preoperative skin disinfection was performed with 0.5% chlorhexidine in 80% alcohol solution for 30 seconds in one trial, and 2.5% iodine in 70% etanol in the other trial. Rates of antibiotics prophylaxis were similar between intervention (10.7%) and control arms (8.2%) in one trial.
- The comparison showed no significant differences between groups for wound infection (RR 1.29, 95% CI 0.97 to 1.71; 2 trials, 1294 women) or reduction of skin colony counts (MD 0.07 colony forming unit per plate; 95% CI -0.34 to 0.48, 1 trial, 79 women).
- There was no significant difference between groups for length of hospital stay (MD 0.10 days, 95% CI -0.27 to 0.46, 1 trial, 603 women).

Implementation considerations

- The successful introduction of this recommendation into national programmes and health-care services depends on well-planned and participatory consensus-driven processes of adaptation and implementation. The adaptation and implementation processes may include the development or revision of existing national guidelines or protocols based on this recommendation.
- The recommendation should be adapted into a locally appropriate document that can meet the specific needs of each country and health service. Any changes should be made in an explicit and transparent manner.
- A set of interventions should be established to ensure that an enabling environment is created for the use of the recommendations, and that the behaviour of the healthcare practitioner changes towards the use of this evidence-based practice.
- In this process, the role of local professional societies is important and an all-inclusive and participatory process should be encouraged.

**Research implications**

The GDG did not identify further research priorities on this topic.

**Related Links**


Supporting systematic review:

[Hadiati DR, Hakimi M, Nurdiati DS, Ota E. Skin preparation for preventing infection following caesarean section. The Cochrane database of systematic reviews. 2014(9):Cd007462.](#)

**References**


**Citation**

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