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Date of Search: 07 Sep 2017

Sources Searched: Medline, Embase.

Intraoperative Glove Changing and Postoperative Complications of Caesarean Section

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1. Effect of intra-operative glove-changing during cesarean on post-op complications: A randomized controlled trial

Author(s): Reddy B.; Scrafford J.

Source: Obstetrics and Gynecology; May 2017; vol. 129

Publication Date: May 2017

Publication Type(s): Conference Abstract

Abstract:INTRODUCTION: An increasing body of literature suggests that vaginal floral bacteria contribute to post-operative infectious morbidity when introduced to normally sterile environments during cesarean section. Surgeon's gloves, exposed to the lower genitourinary tract during delivery of an infant, may be an important vehicle of bacteria to the abdominal wall. Changing gloves during cesarean prior to abdominal wall closure may decrease bacterial transfer to the wound bed and therefore the incidence of wound complications following cesarean section. METHODS: This is a randomized controlled trial. Women undergoing non-emergent cesarean section were randomized to control conditions or intra-operative glove-changing, which entailed surgeons changing outer sterile gloves prior to abdominal closure. The primary outcome is composite wound complications, defined as the occurrence of seroma, hematoma, wound infection, skin separation of at least 1cm, or other incisional separation or abnormality requiring a bedside procedure Enrollment of 554 patients provides 80% power to detect a 50% reduction in the primary outcome from the approximately 15% incidence noted in the first 100 control subjects studied during a planned interim analysis. RESULTS: Of the first 409 patients analyzed, a significant reduction in composite wound complications is observed in the glove changing group (11/185, 5.9%) compared to the control group (29/ 224, 12.9%), with p-value 0.018. At time of this submission, there are 145 subjects remaining to analyze, estimated to complete by December 2016. CONCLUSION: Preliminary analysis of this nearly completed randomized controlled trial indicates a trend toward reduction of composite wound complications following cesarean section when gloves are changed prior to abdominal closure.

Database: EMBASE

2. Do different intraoperative glove practices reduce surgical site infections? A systematic review

Author(s): Landelle C.; Pittet D.; Kubilay Z.; Damani N.; Allen T.; Gans S.L.; Allegranzi B.

Source: Antimicrobial Resistance and Infection Control; Jun 2015; vol. 4

Publication Date: Jun 2015

Publication Type(s): Conference Abstract

Available in full text at [Antimicrobial Resistance and Infection Control](#) - from BioMed Central

Abstract: Introduction: The invasive nature of surgery carries high risk for the transfer of pathogens responsible for surgical site infections (SSI). This risk can be reduced by using protective barriers such as sterile gloves; however, gloving practices vary among different surgical specialties and countries. Objectives: To determine whether double gloving vs single gloving, changing gloves during the operation vs retaining gloves, and using specific type of gloves reduce SSI rates. Methods: We conducted a systematic literature review and searched PubMed, EMBASE, CINAHL, Cochrane CENTRAL, WHO Global Index Medicus, and reference lists of relevant papers for articles published from 1990 to 24/04/2014 in English, Spanish and French. Studies investigating the impact on SSI of the above mentioned interventions related to surgical glove use in patients undergoing surgery were selected. Results: The search yielded 1049 articles and 7 were selected. Two studies comparing double gloving vs single gloving were identified. A retrospective study including 863 surgical patients showed significantly higher cerebrospinal fluid shunt infection rate in the single-gloved group compared to the double-gloved group. The second nonrandomized, "before/after" study found no significant difference in wound sepsis rates after 200 hernia repairs between the double vs single-gloved group. Three randomized control trials (RCT) comparing changing surgical gloves vs retaining gloves in obstetrics were identified; no reduction of postcesarean wound infections and/or endometritis following glove change after delivery of the placenta or the fetus was found. Finally, 2 RCTs compared 3 types of gloves in orthopedic surgery: latex gloves with cotton-cloth outer gloves or latex gloves with outer "orthopedic" gloves or repel cloth gloves between 2 pairs of latex gloves vs 2 pairs of latex gloves; no SSI was reported in these trials in either group. Conclusion: The available evidence to assess the effect of wearing additional gloves, intraoperative glove change or type of gloves on SSI rates is very limited and of low-quality. Our findings indicate the need for RCTs on this topic.

Database: EMBASE

3. Metagenomic analysis of the skin and vaginal microbiota of obese women undergoing cesarean delivery

Author(s): Rood K.; Summerfield T.; Ackerman W.; Thung S.; Buhimschi C.S.; Buhimschi I.A.; Zhao G.; Wang W.; Rumpf R.W.

Source: American Journal of Obstetrics and Gynecology; Jan 2016; vol. 214 (no. 1)

Publication Date: Jan 2016

Publication Type(s): Conference Abstract

Abstract:OBJECTIVE: Human skin harbors complex microbial ecosystems with proposed beneficial and pathogenic roles. Clinical observations pinpoint that obesity is a risk factor for surgical site infections (SSI). We employed metagenomics to explore multilevel interactions between surgical antisepsis technique, skin and vaginal microbiomes in obese women at risk of SSI. STUDY DESIGN: Bacterial DNA samples from term obese (BMI>30, n=31) and non-obese (BMI≤30, n=27) women were collected at specific skin sites (retro-auricular, forearm, infra-umbilical, Pfannenstiel area) before and after chlorhexidine gluconate (CHG) surgical antisepsis and at the end of cesarean delivery. Vaginal and surgical glove DNA samples were analyzed for all cases. Following 16S metagenomics, DNA sequences were clustered and processed via UCHIME alignment algorithm. This yielded 459k unique operational taxonomic units (OTU) that were analyzed using MOTHUR. RESULTS: Higher bacterial load was detected at all sampled sites in obese compared to non-obese women. At the surgical site, before and after skin preparation, obese women have a higher bacterial load (2-way ANOVA, $P<0.001$) and distinct microbiome with predominance of phylum Firmicutes over Actinobacteria. CHG decreased the bacterial load in obese, but not in non-obese women, with persistence of Firmicutes predominance. Following cesarean delivery, the bacterial load was significantly increased at the surgical site for both groups. After surgery, obese women had a higher abundance of Actinobacteria, whereas non-obese women had a greater abundance of Firmicutes (Fig. A). The vaginal and surgical glove microbiomes clustered independently by virtue of obesity and matched the bacterial profile at the incision site post-cesarean delivery (Fig. B), which likely suggests surgical contamination from the vagina. CONCLUSION: For the first time, we show that the skin and vaginal microbiomes of pregnant obese women are distinct, which underscores the importance of incorporating targeted SSI prophylaxis practices before and after cesarean delivery. (Figure Presented).

Database: EMBASE

4. Decreasing Infectious Morbidity in Cesarean Delivery by Changing Gloves

Author(s): Ventolini G.; Neiger R.; McKenna D.

Source: Journal of Reproductive Medicine for the Obstetrician and Gynecologist; Jan 2004; vol. 49 (no. 1); p. 13-16

Publication Date: Jan 2004

Publication Type(s): Article

PubMedID: 14976789

Abstract:OBJECTIVE: To assess whether changing the entire surgical team's gloves intraoperatively, after delivery of the placenta, would reduce the rate of postcesarean wound infection. STUDY DESIGN: Women who underwent cesarean delivery were randomized to a group where the surgical team changed the surgical gloves after delivery of the placenta or to a control group, where surgical gloves were not changed during the cesarean procedure. RESULTS: Ninety-two patients were randomized to 2 groups of 46 patients each. The group where the surgical team changed their gloves had significantly less serosanguineous drainage 24 hours after surgery (3 vs. 8 patients, 8.3% vs. 22.2%, $P = .02$, RR 2.7, CI 0.7, 12.4) and fewer wound infections (2 vs. 9 women, 5.5% vs. 25%, $P = .05$, RR 4.5, CI 0.982, 29.8). CONCLUSION: Obstetricians may decrease the number of postcesarean wound infections by having the entire team change surgical gloves after delivery of the placenta.

Database: EMBASE

5. Effect of changing gloves before placental extraction on incidence of postcesarean endometritis

Author(s): Turrentine M.A.; Banks T.A.

Source: Infectious Diseases in Obstetrics and Gynecology; 1996; vol. 4 (no. 1); p. 16-19

Publication Date: 1996

Publication Type(s): Article

Available in full text at [Infectious Diseases in Obstetrics and Gynecology](#) - from National Library of Medicine

Abstract:Objective: We sought to determine if changing the surgeon's gloves after delivery of the infant and prior to manual placental removal decreases the incidence of postcesarean endometritis. Methods: Laboring women undergoing cesarean delivery between September 1, 1994, and August 31, 1995, were prospectively randomized into either a change or no-change glove group. In the change-glove group, the surgeon's gloves were changed after delivery of the infant and before manual removal of the placenta. All patients enrolled received a single prophylactic dose of an IV antibiotic after clamping of the umbilical cord. Endometritis was diagnosed by an oral temperature of 24 h after delivery, uterine tenderness, peripheral blood leukocytosis ($> 15,000$ cells/ml), and the exclusion of other foci of infection. In order to detect a reduction in endometritis from 14% to 2%, at $P < 0.05$ with 80% power, we needed 95 patients in each group. Results: Two hundred twenty-eight women were randomized to 2 groups: 113 were in the change group and 115 in the no-change group. No significant differences were noted between the groups with respect to demographics, duration of labor, length of ruptured membranes, number of vaginal examinations, duration of internal monitoring, length of surgery, blood loss, or infant weight. There was no decrease in the incidence of endometritis between the change group (17.7%) and the no-change group (15.7%) (relative risk 1.1, 95% confidence interval 0.75-1.47). Conclusions: In this study, the incidence of postcesarean endometritis was not decreased by changing the surgeon's gloves after delivery of the infant but before placental extraction.

Database: EMBASE

6. The effect of manual removal of the placenta on post-cesarean endometritis

Author(s): Atkinson M.W.; Owen J.; Wren A.; Hauth J.C.

Source: Obstetrics and Gynecology; Jan 1996; vol. 87 (no. 1); p. 99-102

Publication Date: Jan 1996

Publication Type(s): Article

PubMedID: 8532276

Available in full text at [Obstetrics and Gynecology](#) - from Ovid

Abstract:Objective: To determine if intraoperative glove change and placental delivery method affect the post-cesarean endometritis rate. Methods: After informed consent, women who required cesarean were randomly assigned to one of four study groups: 1) no glove change plus manual placental extraction, 2) no glove change plus spontaneous placental delivery, 3) glove change plus manual extraction, and 4) glove change plus spontaneous delivery. Bilateral glove change by both primary and assistant surgeons occurred immediately after delivery of the newborn and before delivery of the placenta. External uterine massage and traction on the umbilical cord were performed to assist spontaneous delivery of the placenta. A first-generation cephalosporin was routinely administered after umbilical cord clamping for prophylaxis of post-cesarean endometritis. Results: Of 760 women entered into the study, we included 643 who did not have intrapartum chorioamnionitis or cesarean hysterectomy. The four groups were comparable with respect to selected maternal and intrapartum characteristics, including maternal and gestational age, parity, presence of labor, and the presence and duration of membrane rupture. The postoperative endometritis rate was significantly higher in women whose placentas were extracted manually (31 versus 22%, $P = .01$). Operator glove change did not alter the incidence of endometritis (relative risk 1.0, 95% confidence interval 0.79-1.3). Conclusion: Manual extraction of the placenta is associated with a significantly greater risk of post-cesarean endometritis than that observed with assisted spontaneous placental delivery. Intraoperative glove change does not decrease post-cesarean endometritis.

Database: EMBASE

7. The frequency of glove contamination during cesarean delivery

Author(s): Yancey M.K.; Clark P.; Duff P.

Source: Obstetrics and Gynecology; 1994; vol. 83 (no. 4); p. 538-542

Publication Date: 1994

Publication Type(s): Article

PubMedID: 8134063

Abstract:Objective: To determine the frequency of glove contamination associated with fetal extraction during cesarean delivery. Methods: The study was performed in 25 women having scheduled or unscheduled cesarean delivery. Surgeons double-gloved for all procedures. Immediately before and after delivery of the fetus, the dorsal aspect of the fingers and hand of the surgeon's outer glove was swabbed with cotton-tip applicators and cultured for aerobic and anaerobic organisms. Only the glove from the hand that was used to deliver the infant was cultured. Results: Nine of 25 cultures (36%, 95% confidence interval [CI] 17-55) performed immediately before fetal extraction were positive for staphylococci. No other organisms were isolated. Cultures performed following fetal extraction showed non-staphylococcal bacteria in 11 of 14 (79%, 95% CI 58-100) laboring women and one of 11 (9%, 95% CI 0-26) nonlaboring women, a statistically significant difference ($P < .01$). In the laboring patients, non-staphylococcal bacteria were isolated with similar frequency from the dorsal aspect of the hand (seven of 14, 50%, 95% CI 24-76) and the

fingers (ten of 14, 71%, 95% CI 47-95). These cultures yielded mostly bacterial species from the Enterobacteriaceae family. Conclusion: In laboring patients with ruptured membranes, delivery of the fetal head frequently results in contamination of the surgeon's glove with pathogenic bacteria. This finding may partially explain the increased frequency of post-cesarean endometritis associated with manual extraction of the placenta.

Database: EMBASE

8. Effects of placental delivery method and intraoperative glove changing on postcesarean febrile morbidity.

Author(s): Cernadas, M; Smulian, J C; Giannina, G; Ananth, C V

Source: The Journal of maternal-fetal medicine; 1998; vol. 7 (no. 2); p. 100-104

Publication Date: 1998

Publication Type(s): Comparative Study Randomized Controlled Trial Clinical Trial Journal Article

PubMedID: 9584823

Abstract: This study was designed to evaluate the effects of the placental delivery methods and intraoperative glove changing on postcesarean febrile morbidity. In this randomized controlled trial, consenting patients were randomized to one of four management protocols: Group A (n = 26)--no glove change with manual placental delivery; Group B (n = 27)--no glove change with expressed placental delivery; Group C (n = 27)--glove change with manual placental delivery; and Group D (n = 28)--glove change with expressed placental delivery. Glove change was performed by removal of a second glove after delivery of the fetal head. Variables examined included febrile morbidity, endometritis, maximums and durations of elevated temperatures, as well as other demographic, intrapartum, and postpartum variables. Febrile morbidity and endometritis rates were not significantly different between the four groups. When the groups were combined so as to compare no glove change versus glove change (Groups A and B vs. C and D) and manual versus expressed placental delivery (Groups A and C vs. B and D), there were no significant differences in either febrile morbidity (relative risk: 0.7, 95% CI: 0.3-1.4 and relative risk: 1.4, 95% CI: 0.6-3.5) or endometritis (relative risk: 1.2, 95% CI: 0.5-2.8 and relative risk: 1.5, 95% CI: 0.6-3.6), respectively. There were no statistically significant differences in measures of postcesarean febrile morbidity based on placental delivery method or intraoperative glove change.

Database: Medline

Strategy 269573

#	Database	Search term	Results
1	EMBASE	exp "SURGICAL GLOVES"/	3326
2	EMBASE	exp "CESAREAN SECTION"/	82288
3	EMBASE	(1 AND 2)	27
4	EMBASE	exp ENDOMETRITIS/	5601
5	EMBASE	(1 AND 4)	6
6	EMBASE	(glove*).ti,ab	11797
7	EMBASE	(caesarean* OR cesarean* OR "c section").ti,ab	72678
8	EMBASE	(infect* OR endometritis).ti,ab	1861078
9	EMBASE	(6 AND 7 AND 8)	28
10	Medline	(glove*).ti,ab	9059
11	Medline	exp "GLOVES, SURGICAL"/	2858
12	Medline	(10 OR 11)	9893
13	Medline	(caesarean* OR cesarean* OR "c section").ti,ab	51191
14	Medline	exp "CESAREAN SECTION"/	39866
15	Medline	(13 OR 14)	63410
16	Medline	(endometritis).ti,ab	3197
17	Medline	exp ENDOMETRITIS/	3683
18	Medline	(infect*).ti,ab	1469655
19	Medline	exp "POSTOPERATIVE COMPLICATIONS"/	476840

20	Medline	(16 OR 17 OR 18 OR 19)	1888198
21	Medline	(12 AND 15 AND 20)	16
22	Medline	(vagina* ADJ2 microflora*).ti,ab	363
23	Medline	(12 AND 20 AND 22)	2
24	EMBASE	exp "VAGINA FLORA"/	2763
25	EMBASE	(1 AND 4 AND 24)	0
26	EMBASE	(1 AND 24)	1