Study Title: A Randomized Controlled Trial: Do Single Use Negative Pressure Dressings Reduce Wound Complications in Women with a BMI >40 kg/m^2 Undergoing Cesarean Delivery at a Tertiary Medical Center?

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I. Aim and Hypotheses

We aim to show that single use negative pressure dressings can decrease the rate of wound complications in obese women (BMI >40 kg/m^2) undergoing cesarean deliveries at Tufts Medical Center.

II. Background and Rationale

A. **Background**:

Obesity, defined as a BMI >30 kg/m^2, is a growing epidemic in the United States, affecting 35% of the adult population. Reproductive aged women, 20 to 39 years old, are no exception, with obesity estimated at 31.9% of women in this age group(1). At the same time, the rate of cesarean delivery and infectious morbidity is increased in the obese population(2, 3) and maternal obesity increases the risk of post operative wound complications in women undergoing cesarean delivery(4). With cesarean delivery being the most common major operation in the United States, surgical site infections (SSIs) in obese women undergoing cesarean delivery is a growing problem that plagues the health care system and patients. Surgical site infections are the largest cause of nosocomial infections, implicated in 38% of all nosocomial infections. The CDC has defined a SSI as an infection related to an operative procedure that occurs at or near the surgical incision within 30 days of the procedure and further classifies SSIs as superficial incisional, deep incisional, or organ/space SSIs(5). At Tufts Medical Center, approximately 16% of the obstetric population has a BMI >40 kg/m^2 when they present to labor and delivery and this percentage is even higher in women undergoing cesarean delivery. It has been shown in a secondary cohort of a randomized controlled trial that women with extreme obesity, BMI > 45 kg/m^2, have a twofold to fourfold increase in postoperative complications, which includes a 18.8% risk of wound complications(6). Another retrospective cohort study showed that obese women with a BMI >50 kg/m^2 have a 1 in 3 risk of a wound complication(7). A retrospective cohort study of obesity and post cesarean wound complications showed that there was a dose response relationship between obesity and post cesarean wound complications(8). The causes of SSIs and wound complications are multifactorial, however body mass index plays a large role. Interventions to decrease wound complications in the obese population is an important area of interest with the potential to have a significant impact on post-operative care in obstetrics. In addition to the significant cost of additional treatments and hospital re-admissions, wound complications can cause significant personal distress and interfere with maternal/child bonding.

Cohort studies in obstetrics have suggested that single use negative pressure dressings can decrease the risk of SSIs(9). However, at this point there is a paucity of randomized controlled trials that offer definitive evidence to support this additional expense. The PICO Single Use Negative Pressure Wound Therapy System by Smith and Nephew is a 4 X 11¾ inch dressing attached to a small pump that can deliver a negative pressure of –80 mm Hg[5] and remain in place for up to 7 days. This dressing also comes in larger sizes. A light indicator gives a green light if vacuum pressure is appropriately applied or a yellow light if there is an inadequate seal. A recent pilot study, a retrospective cohort study in women with a BMI >45 kg/m^2 who underwent a cesarean delivery, found that single use negative pressure dressing reduced the rate of wound complications, 10.4% in the control group, and 0% in the study group, p=0.15(10). While this study was underpowered and did not achieve statistical significance, it does provide initial evidence that this device could be a benefit in this population. Single use negative pressure dressings have been well utilized in surgical fields outside of

obstetrics, and have been shown to decrease the rate of surgical site infections(11). A retrospective study in patients undergoing open colectomies, and open abdominal procedure not unlike a cesarean, showed a decrease in surgical site infections in a multivariate logistic regression, OR 0.32, $p<0.05$, when single use negative dressings were employed(12).

B. **Rationale**:

Obese women undergoing cesarean deliveries are at increased risk for post-operative wound complications. A single use negative pressure dressing is a non-invasive safe device that may decrease this risk. Prior to initiating widespread use of this dressing, which adds additional expense to a cesarean delivery, it is prudent to prove that the intervention does decrease post operative wound complications. PICO Single Use Negative Pressure Wound Therapy (NPWT) is available at Tufts Medical Center, is FDA approved, and currently in use on Labor and Delivery. Currently, at the discretion of the attending physician, a PICO NPWT can be placed over the incision of women hypothesized to be high risk for a wound infection. At this time there is not definitive evidence to support this practice.

III. Research Plan

A. Experimental design: Randomized Controlled Trial

B. Sample size and statistical analysis(es):

Sample Size: At this time the wound complication rate at Tufts Medical Center is difficult to determine as not all complications are identified during the delivery admission and often complications are often diagnosed as an outpatient. However based on experience, the wound complication rate in patient with class III obesity approximates 30% at Tufts Medical Center. Based on sample size calculations, 242 subjects need to be randomized, with 121 in each study arm, to detect a statistically significant change in wound outcome between the study arms. A study of this size would have 80% power to detect a difference between treatment groups in the risk of wound complication from 30% to15%. The sample size calculations assume two-tailed tests with alpha=0.05. The cesarean delivery rate at Tufts MC is approximately 30%. Patients are recruited and sign informed consent for this study when they are admitted to the Labor and Delivery at Tufts Medical center. This may be prior to knowing if they will undergo a cesarean section or if they will deliver during this hospital admission. If 30% of patients with a BMI > 40 kg/m^2 have a cesarean delivery, and not all patients deliver during their hospital admission, then approximately 1,000 patients need to be enrolled and consented in order to randomize 242 subjects. It is possible that additional subjects will need to be recruited if more patients decline participation in the study, do not undergo cesarean, or are discharged prior to delivery than estimated.

The rate of wound morbidity in the obese population has been reported to span a large range. One study showed that wound morbidity in the obese population was noted to be 47.5% in obese women with a vertical skin incision(13). Patients in this study can have either a Pfannenstiel or vertical skin incision depending on the clinical scenario. We based our definition of a wound complication on the CDC'c criteria for surgical site infection (SSI), which encompasses superficial, deep, and organ space SSIs, as well as additional complications such as skin blisters around the incision, scar separation >1 cm, seroma requiring evacuation, hematoma requiring evacuation, wound debridement, hospital re-admission, and additional operating room management. These wound complications will be included as outcome variables. Superficial skin infections are defined as incisions with purulent drainage, organisms isolated from aseptically obtained culture or fluid, pain, tenderness, localized swelling, redness, or the incision is deliberately opened by surgeon, or the diagnosis of a superficial SSI diagnosed by a surgeon or attending physician. Deep incisional SSIs include purulent drainage from the deep incision but not organ space, a dehiscence or deliberate opening of the deep incision due to fever, localized pain, or tenderness, an abscess of the deep incisional space, or the diagnosis of a deep incisional SSI by a

surgeon or attending physician. Lastly, organ/space SSIs involves purulent drainage, isolated aseptically obtained organisms, or an abscess in another part of the anatomy that was opened during the original surgery.

Statistical Analysis: The composite outcome of interest (development of any wound complications) by 6 weeks will be tested using a Kaplan Meier survival analysis with intention to treat analysis. Demographic and clinical variables will be compared between the two groups to check for balance. If it found that confounders are imbalanced between groups, a Cox regression model will be performed to adjust for those variables. In addition, if patients do not receive the treatment they were randomized to, a secondary analysis will be performed analyzing patients as they were treated.

All attempts will be made to minimize loss-to-follow-up, and reasons for any missing data will be tabulated. Procedures to prevent missing data are described in detail below. Given the risk of missing data, a Kaplan Meier survival analysis will be used to minimize the impact of loss to follow up. A time-to-event analysis will be performed instead to account for censored data, and information from the last known visit will be used. Such a model would also account for demographic and clinical confounders.

In addition to evaluating the primary composite outcome of wound complication, superficial, deep, and organ space SSIs, skin blisters around the incision, scar separation >1 cm, seroma requiring evacuation, hematoma requiring evacuation, wound debridement, hospital re-admission, and additional operating room management secondary analyses will be performed. For secondary analyses, each complication outcome will be analyzed independently, as well as second composite outcome of major complications, including deep incisional SSIs, scar separation > 1 cm, seroma requiring evacuation, hematoma requiring evacuation, wound debridement, hospital readmission and additional operating room management. The outcome variables are similar to those used in previous studies (9).

C. Subject Characteristics

1. Subject criteria: Women presenting for care at Labor and Delivery at Tufts Medical Center with a BMI >40 kg/m^2 will be approached to participate in this study. BMI will be determined from their weight measurement at their last obstetric visit or if not available, their reported weight at the time of admission will be used.

a) Inclusion criteria: BMI >40 kg/m^2 undergoing cesarean delivery for any cause and willing to have a 2 week post operative follow-up for a wound evaluation at Tufts Medical Center.

b) Exclusion criteria: Exclusion criteria for this study is limited as we aim to make this study as generalizable as possible to the obstetric population. Women less than age 18, women with an active infection in the location of Pfannenstiel skin incision, women not willing to come to Tufts Medical Center for a wound evaluation 2 weeks post operatively, women who do not have height and weight information available, and women with a BMI < 40 kg/m^2 will be excluded from this study.

c) Withdrawal/Termination criteria: Patient request

D. **Risk/benefit assessment**: Patients will be followed and assessed for the primary outcome of wound complications, which can include superficial, deep, and organ space SSIs, skin blisters around incision, scar separation >1 cm, seroma requiring evacuation, hematoma requiring evacuation, wound debridement, hospital readmission and additional operating room management.

1. **Physical risk**: The PICO NPWT is already in use in the high risk obstetric population at Tufts Medical Center. There is the risk that the patient will experience skin irritation associated with the adhesive on either the PICO NPWT or the standard dressing. An increased risk of adverse events with PICO NPWT dressings have not been reported in the literature, however, there could be a delay in the diagnosis of superficial skin infections in

the PICO NPWT study arm as the incision is not inspected daily. Other signs of cellulitis, such as fever or abdominal tenderness, would not be masked by the dressing. This population is at significant risk at baseline for post-operative wound complications.

2. **Psychological risk**: None

3. **Social risk**: There is the risk of loss of patient confidentiality.

4. **Economic risk**: There is no cost to the patient associated with the use of this dressing at this time. This device is not charged to the patient separately from global cesarean charge at this time.

5. **Benefit of participating in the study**: There are no direct benefits to the study participants. However it is possible that one study arm will have an improved wound outcome.

E. Specific methods and techniques used throughout the study:

1. **Laboratory tests**: none
2. **Study Procedures**: Based on randomization, a standard dressing or the PICO Negative Pressure Wound Therapy are applied after skin closure.

Protocol

Enrollment

All pregnant women admitted the labor floor at Tufts Medical Center with a BMI >40 kg/m^2 and without the above mentioned exclusion criteria will be approached to participate in this study of standard dressing verses PICO NPWT in the event they undergo a cesarean delivery. If patients present for a scheduled cesarean delivery, they will be asked to participate in this study when they are in the pre-operative area. Women admitted for labor, or induction of labor will be asked to participate when they are on the labor floor, after they have been admitted and seen by medical teams, but before the decision to proceed with cesarean delivery is made. Women admitted to the labor floor at Tufts Medical Center for other medical or obstetric indications will be asked to participate once admitted and medically stable, however before the decision to proceed with cesarean delivery is made. If a patient needs time to decide on participation, she will be left with the informed consent and asked to notify her nurse if she would like to participate, and the nurse will notify the study team. Otherwise a member of the study team will approach the patient one more time to ask for participation. If a patient receives prenatal care at Tufts Medical Center in the outpatient setting, and meets eligibility criteria for enrollment, the patient can be approached following a regularly scheduled clinic visit at the discretion of the outpatient clinician. If a patient is undergoing an emergent or urgent cesarean, and did not already consent to participate in the study, they will not be approached to participate. Subjects must be willing to have a follow up wound evaluation at Tufts Medical Center approximately 2 weeks post operatively. Informed consent will be obtained by designated study personnel. Subjects, however, will be randomized to either study arm at the time of facial closure. The decision to proceed with cesarean delivery will be based on medical or obstetric indications, and not influenced by enrollment in the study. If the patient consents to be part of the study, then demographic information will be abstracted from the patient and the patient's hospital chart.

Procedure

When in the operating room, the operative procedure will not deviate from normal operating room procedures. All women will receive standard surgical prophylaxis with cefazolin or in penicillin/cephalosporin allergic, standard weight based dosing of gentamycin and clindamycin. If a subject is diagnosed with

chorioamnionitis during labor, she will receive standard treatment antibiotics. The actual antibiotic will depend on her allergies. Sterile abdominal preparation will follow the standard labor floor protocol prior to the start of the case. The operative steps of the cesarean delivery would be routine and up to the discretion of the attending physician. After delivery of the fetus, again management will be up to the discretion of the surgical team. In our obstetric population, patients are not routinely on therapeutic anticoagulation at the time of delivery. In all but urgent/emergent cases, anticoagulation is held prior to surgery and during labor. Per usual practice, hemostasis in achieved prior to closing a patient's abdomen at the time of a cesarean section. After fascial closure, the subcutaneous tissue is inspected, and electrocautery is utilized if necessary for hemostasis. The skin is only closed after the subcutaneous tissue is hemostatic. If there was a surgical complication, such as increased bleeding or an unexpected injury, the attending surgeon would have the option of declining participation in the study. If this occurred, the patient would not be randomized to either study arm. Study investigators will keep track of patients that consent to the study, undergo a cesarean delivery, and are not randomized.

Randomization

At the time of fascial closure, participants will be randomized to receive either the standard dressing or the PICO NPWT using a previously developed randomization schema based on randomly permuted blocks of 4, 6, and 8. These envelopes will be created by personnel that are not involved with enrolling or randomizing patients. At the time of randomization in the operating room a sealed numbered envelope will be opened in numerical order, and the assignment group will be read out loud. Currently at Tufts Medical Center, the usual post cesarean section dressing consists of a non-adherent sterile gauze and sterile gauze covered with waterproof transparent bandages. After randomization, the specified dressing (standard vs PICO NPWT) will then be assembled by the operating room staff. The subcutaneous layer will be reapproximated if greater than 2 cm in depth, per normal protocol. The skin will be closed with suture or staples at the discretion of the surgical team. At the end of the procedure, the pre-determined dressing will be placed by the resident and scrub technician. The PICO NPWT dressing comes with a small pump, two dressings, and fixation strips, and the extra dressing and fixation strips will remain with the patient.

Post-Operative Care

All subjects will have a post-operative check approximately 4 hours after their cesarean delivery. This is routine and not a deviation from normal clinical practice. At that time the patient's vitals will be reviewed and they will be examined. The physical exam includes an inspection of the surgical dressing. Routinely, areas of blood saturation on the dressings are noted, and if this is abnormal, the dressing would be removed, hemostasis achieved, and the appropriate dressing re-applied.

During the post-operative period all patients will receive routine post-operative care with discharge home on post operative day 4 if their post operative course is uncomplicated. Per routine, patients randomized to the standard dressing will keep their dressing in place for 12 to 48 hours post operatively, with a wound evaluation daily as part of their daily physical exam. Patients randomized to the PICO NPWT arm will also be evaluated daily, however their dressing will be in place until the day of discharge or until the indicator light on the pump signals that there is no longer an adequate seal and the dressing needs to be changed. The skin area around the dressing will be evaluated daily. The PICO NPWT dressing will be removed, the incision inspected, and a new PICO NPWT dressing replaced either on the day of discharge, or when the indicator on the pump changes from green to orange. The dressing can be removed by the patient at home after 7 days of total use, or sooner if the pump indicator changes from green to orange indicating that the pump no longer is maintaining a seal. If the patient received staples for skin closure and had a Pfannenstiel skin incision, then the staples can be removed and steri strips applied on post operative day 3 or 4, which corresponds to when the PICO NPWT dressing is replaced. It is normal obstetric practice to remove stables in a Pfannenstiel skin incision on post operative day 3 or 4. If the patient had a vertical skin incision closed with staples, staples are normally removed between post operative days 7 and 10. This would require an additional outpatient visit.

At any time during the post operative course a patient will be treated with antibiotics if there is the clinical suspicion for a wound infection or if the patient has a febrile illness concerning for infection. Medical management of a post operative complication will not be altered due to participation in this study. If a patient in the PICO arm becomes febrile (>100.4), the PICO dressing will be removed and the wound evaluated, however the dressing can be replaced if there is no evidence of a wound complication.

The most serious complications include hospital readmission and additional operating room management. These complications are rare, and the decision to proceed with these steps would be up to the patient's physician. While the study is not blinded to randomization arm, physicians will be independently evaluating their patients and basing further treatment on their best clinical judgment.

Follow-Up

After discharge from Tufts Medical Center, all patients will be scheduled for a follow up wound evaluation approximately two weeks post operatively in the ambulatory clinic at Tufts Medical Center, which is common practice among patients at high risk for wound complications. To minimize loss to follow up, patients will be called to remind them of their 2 week follow up appointment 24-48 hours prior to their appointment and they will be asked a series of questions about their incision at that time. If they are not able to be reached, then additional attempts will be made to reach them. If they miss their 2 week wound evaluation, they will be called to reschedule. At this visit the surgical incision will be evaluated by members of the wound team, MFM fellows and MFM attendings, who have been trained in a standardized way to evaluate the incision. Wound management, if complications arise, will be at the discretion of the evaluating physician. Patients will follow up at 6 weeks post partum at Tufts Medical Center, Tufts satellites, or their primary obstetrician's office. Given that not all patients will present to Tufts Medical Center for a 6 week follow up visit, all patients will be called at approximately 6 weeks post partum and asked standardized questions about their surgical incisions and possible complications. If they are not reached, additional attempts will be made to contact the subject.

Outcome Measurement

The primary outcome will be a composite outcome of wound complications, which includes superficial skin infection requiring antibiotics (cellulitis), skin blisters around incision, scar separation > 1 cm, seroma requiring evacuation, hematoma requiring evacuation, wound debridement, hospital readmission and additional

operating room management. This composite outcome is similar to the primary outcome in a recent historical cohort looking at NPWT and post-operative complications (9).

The primary outcome will be considered positive if any of the composite items were diagnosed in the period between delivery and 6 weeks post-partum. The outcome is the variable of interest; the time within the 6 week post-partum period that the outcome occurred is not critical in this study. The medical records from the hospitalization, wound check at 2 weeks post-partum, and information from the phone calls at 2 and 6 weeks post partum will be reviewed and if the patient was positive for any of the mentioned outcomes then that would be considered an event. Specifically, all the daily progress notes from hospital admission, discharge medications (antibiotics), and hospital discharge summary will be evaluated. On the day of discharge, the discharging team (resident and attending) will complete a specific "Incision Note" in OBTRACEVUE, the electronic medical record system used for all inpatient obstetric patients. This "Incision Note" will be a template and allow the residents to answer basic questions pertaining to post-operative fevers, additional antibiotics given during the post-operative period, and diagnoses of cellulitis, skin blisters, scar separation, seroma requiring evacuation, hematoma requiring evacuation, wound debridement, and additional operating room management. This note will be completed by the residents and signed by the discharging attending. The "Incision Note" completed by the residents on the day of discharge will help to standardize outcomes. If the residents do not complete this note, the data will be abstracted from the medical records.

After the 2 week post operative follow up visit with a member of the wound team, the evaluating physician will fill out a short wound evaluation form, and the outpatient notes will be reviewed in detail, specifically the HPI, physical exam where the incision is described, and assessment/plan portion of the notes. If antibiotics are prescribed or further treatment is needed it would be noted in the medical records and on the short evaluation form. If there is a wound complication, it would be described in detail, with measurements and treatment if applicable. Members of the wound team will be trained to standardize their evaluation. Due to patient scheduling needs, it is possible that the patient could be seen outside of their anticipated visits, and these notes will be reviewed as well and any of the components of the composite outcome will count as an event.

All patients will be called on the telephone 24 to 48 hours prior to their approximately 2 week post-partum visit to remind them of their scheduled appointment. If they do not attend this appointment, they will be called to reschedule and at that time they will be asked if they had any of the composite outcomes and these results will be recorded. They will be called at 6 weeks post partum and at this time, they will be asked if they had any of the composite outcomes and these results will be recorded. The course of follow-up (6 weeks) is stated in the informed consent process. The assessment period will conclude at their final post-partum phone call, approximately 6 weeks post-partum. To standardize the results, the initial hospitalization, 2 week post partum wound evaluation and phone call, and the 6 week post partum phone call will be used to obtain the outcomes. Due to the complexity of the lives of these patients, it is possible that a patient will not present precisely at the 2 week wound evaluation, however any visit within that time period with a member of the wound team will be adequate to assess for wound complications. The above described phone calls at 2 and 6 weeks post-partum will aid in assessing outcomes if the patients do not present for their appointments.

3. **Subject Timeline**: This study will run for two years, from the month is approved 2016 to 2018.

F. Assessment of Subject Safety and Development of a Data and Safety Monitoring Plan

1. Definition of Serious Adverse Event (SAE) and Adverse Event (AE) for this study: Wound complications, infection, and wound breakdown are anticipated in this population, obese women undergoing cesarean delivery. A SAE would be a severe necrotizing infection such as necrotizing fasciitis. Women with severe wound complications of febrile morbidity will be admitted to the hospital for further management. While wound complications are anticipated in this population, the rate of severe adverse events is not expected to increase. This is a small study, and a Data Safety and Monitoring Board is not necessary. If SAEs occur, the evaluation

will be investigator initiated, and events will be reported to the IRB per the IRB's Reportable New Information policy.

2. Reporting timeframe for SAEs and AEs: SAEs and AEs will be reported to the Tufts MC/TUHS IRB per the IRB's Reportable New Information Policy.

3. Accountability procedures as they relate to drugs, devices, and data: Every effort will be made to keep a subject's data confidential. Data collected will be maintained on a password protected database in a locked office at Tufts MC. Study data will be kept in a locked electronic database for 7 years after the completion of the study.

G. Subject Participation

1. **Recruitment**: Women will be recruited for this study when they are either (1) admitted to the labor floor at Tufts Medical Center if their BMI is > 40 kg/m^2 or (2) during an office visit to the obstetrics and gynecology department at Tufts Medical Center for regular prenatal care at a date prior to their planned hospital admission Subjects will be approached by members of the research team and asked to participate in the study on wound dressings if they undergo a cesarean delivery. The basis of the study will be explained, and the two possible dressings and the follow up will be described. Some patients who are enrolled in the study will not be randomized as not all patients will be delivered at Tufts Medical Center or undergo cesarean delivery.

2. **Registration**: Patients will be designated a study participant when they sign the informed consent document. Subjects will be randomized to either study arm at the time of facial closure when they undergo cesarean delivery. Not all patients will be randomized or included in the analysis as not all patients who sign an informed consent will have a cesarean delivery.

2. **Screening Interview/questionnaire**: not applicable

3. **Transportation**: Patients will be seen at their regularly scheduled visits, no additional transportation is required.

4. **Informed consent process and timing of obtaining of consent**: Informed consent will be obtained after either (1) admission to labor and delivery or (2) during an office visit to the obstetrics and gynecology department at Tufts Medical Center for regular prenatal care at a date prior to their planned hospital admission by an approved member of the research team. The consent interview will take place in the subject's private room at Tufts MC after the patient has been seen by the necessary medical teams. When the patient is initially approached to participate in the study, the study will be explained and they will have the opportunity to ask any questions. We will explain that their participation in the study does not mean they will have a cesarean section, and that study participation will not change their medical care during their hospitalization. We will discuss that even if the patient does not participate in the study, she may receive either of the two dressings, depending on the preference of the medical team. We will discuss that their medical history, demographic information, and wound outcomes will be kept confidential on a locked computer. Subjects will be asked if they understand the study and that it is voluntary. Subjects will not be pressured to make a decision to participate, and while they will have the option of signing consent at the time of the initial interview, or if they would like more time, then a member of the research team will check in with the subject the next day. The subject can decide not to participate in the study at any time. The persons obtaining informed consent

are all medical doctors or research staff from the department of obstetrics and gynecology on the study team, however this person may also be the medical doctor in charge of the patient's care.

a. **If non-English speaking persons will be enrolled, state the informed consent process for enrolling the subjects, including who will conduct the consent interview, use of interpreters, translated documents, etc.:** We do anticipate enrolling non-English speaking patients, if they fit our inclusion and exclusion criteria. For these patients, the Tufts Medical Center Short Form will be used per the Tufts IRB policy.

6. **Location where study will be performed**: The study will be conducted at Tufts Medical Center, 800 Washington Street, Boston MA 02111. Records will be kept on a locked spreadsheet on a computer in a locked office at Tufts Medical Center. The initial data collection sheet that is used to abstract demographic information and record operating room information will be used to input data into the spreadsheet and then stored in a locked office.

7. **Personnel who will conduct the study, including**:
   a. **Present during study procedure(s) and their proximity during the study**: Ashley Peterson will be responsible for conducting the study, however, as the standard dressing and PICO NPWT are currently in use on labor and delivery, study personnel will not always be present during randomization and bandage placement.

   b. **Primary responsibility for the following activities**:

      i. **Obtaining informed consent**: Members of the study team obtaining informed consent include the following obstetricians: . The study is now closed to enrollment. Moving forward, no members of the study team will be obtaining informed consent from participants.

      ii. **Providing on-going information to the study sponsor and the IRB**: Ashley Peterson

      iii. **Maintaining participant's research records**: Ashley Peterson

8. **Subject fees**: none

9. **Study results**: Subjects will not be notified of results.

10. **Procedures to protect subject confidentiality**: Patient data will be stored in a password protected spreadsheet on a computer in a locked office at Tufts Medical Center. Physical papers used to abstract demographic information and operating room data will be stored in a locked office.

11. **Confidentiality**:

    a. **Certificate of Confidentiality**: Not applicable

    b. **How data will be coded, recorded, and stored to protect confidentiality**: Data with patient demographic and operative information will be recorded on a paper form during the cesarean delivery, and placed in a locked box at the end of the case. Forms will be collected and inputted into a password protected data set which will on a Tufts Medical Center computer in a locked office and the forms will be stored in a locked office. Clinical data from the hospital admission, post operative visits, and phone calls will be

recorded in the electronic medical record, which requires a username and password to access. Data will be abstracted from the electronic medical record and inputted into the locked spreadsheet.

c. **Parties who will have access to the date, including the key to the identity code**: Michael House, Ashley Peterson

d. **Parties who will have access to research records:** Michael House, Ashley Peterson

12. **Collaboration**: NA

13. **Alternatives**: If a patient does not participate in this study, then they could receive either the standard dressing or the PICO dressing at the end of their cesarean delivery.

14. **How new information will be conveyed to the study subject and how it will be documented**: Not applicable

15. **Payment, including a prorated plan for payment**: none

16. **Payment for a research-related injury**: none

I. **Outcome**: We expect to see a statistically significant difference in wound complications, specifically major complications, between the standard dressing and PICO dressing study arms. The endpoint will be when 242 patients are randomized to either study arm. The study results will be reported in a peer reviewed journal after study completion.

J. **Tissue banking considerations**: None

VULNERABLE POPULATIONS: Pregnant patients.

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Obstetrics and Gynecology

INFORMED CONSENT TO PARTICIPATE IN RESEARCH

A Randomized Controlled Trial: Do Single Use Negative Pressure Dressings Reduce Wound Complications in Women with a BMI > 40 kg/m^2 Undergoing Cesarean Delivery at a Tertiary Medical Center?

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INTRODUCTION

You are being invited to take part in a research study involving how your cesarean wound incision will be covered immediately after delivery, if you have a cesarean delivery. Participating in this study does make you more or less likely to have a cesarean section. If you have a cesarean, some women receive a standard bandage of tape and gauze that is placed over their incision. This bandage is removed 1 or 2 days after surgery. Some women are at high risk for wound complications. Sometimes a doctor decides to use a special bandage to help prevent wound complications. This bandage is attached to a small pump and is placed over the incision. The pump is turned on and this creates a suction (negative pressure) within the bandage. This bandage can stay in place for 7 days. At this time, we do not know which bandage is better for our patients at high risk for wound complications. We would like to randomize subjects to receive either the standard gauze and tape bandage or the negative pressure bandage and see which subjects do better.

Taking part in this research study is entirely your choice. You can decline to participate in this study. If you decide to participate in this study, you can stop taking part in the study at any time for any reason. If you decline to participate in the study or stop being in this study, it will not affect your medical care, payment for your health care, or your health care benefits.

Please read all of the following information carefully. Ask Dr. Peterson or Dr. House, or their representatives, to explain any words, terms, or sections that are unclear to you. Ask any questions that you have about this study. Do not sign this consent form unless you understand the information in it and have had your questions answered to your satisfaction.

If you decide to take part in this research study, you will be asked to sign this form. You will be given a copy of the signed form. You should keep your copy for your records. It has information, including important names and telephone numbers, to which you may wish to refer in the future.

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New things might be learned during this study that you should know about. The investigators will tell you about new information that may affect your willingness to stay in this study.

If you are eligible to participate and decide to be in the study, the Principal Investigator may still choose to stop your participation in this study if he thinks it is in your best medical interest. You will not be included in the study if you have a cesarean delivery but are not randomized to either study arm while in the operating room.

If you withdraw or are withdrawn from the study, any data collected from you before your withdrawal will still be used for the study.

As a participant in this study, your identity, medical records, and data relating to this study will be kept confidential, except as required by law.

If you have question about your rights as a research study subject, call the Tufts Medical Center and Tufts University Health Sciences Institutional Review Board (IRB) at (617) 636-7512. The IRB is a group of doctors, nurses, and non-medical people who review human research studies for safety and protection of people who take part in the studies. Federal law requires the IRB to review and approve any research study involving humans. This must be done before the study can begin. The study is also reviewed on a regular basis while it is in progress.

This research study has been reviewed and approved by the IRB of Tufts Medical Center and Tufts University Health Sciences.

PURPOSE OF STUDY

The purpose of this study is to determine if a negative pressure dressing, called the PICO Negative Pressure Wound Therapy, will improve healing of a cesarean section wound in women with a BMI > 40 kg/m^2. The bandage is approved for use by the FDA (Food and Drug Administration). The PICO bandage was previously studied in patients who are not pregnant. Our goal is to study healing with the PICO bandage after a cesarean section. The PICO bandage is currently used on labor and delivery, however use of this dressing is not the standard of care.

In some women, the cesarean section wound does not heal well. The wound can open up or get infected. Women who are obese are at increased risk for a wound complication. In this study, our goal is compare the PICO bandage to the standard bandage for healing a cesarean section wound. It is possible that the PICO bandage will reduce wound complications. But it is also possible that the PICO bandage will have no effect or even increase wound complications.

Normally, the standard of care at Tufts Medical Center, for subjects like you who would benefit equally from both the standard dressing or the PICO Negative Pressure Wound Therapy, would involve a conversation between the medical teams about the surgical dressing options. The decision to choose either the standard dressing or the PICO Negative Pressure Wound Therapy may depend the personal preference of the doctor. Participating in this study is different from the standard of care because neither the patient nor the doctor gets to choose which dressing is used.

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You will be randomly assigned to the standard dressing or the PICO Negative Pressure Wound Therapy.

The study will be conducted at Tufts Medical Center, 800 Washington Street, Boston MA 02111, on Labor and Delivery. 1,000 subjects will be enrolled however not all of these subjects will undergo cesarean delivery. We plan to randomize 242 subjects.

PROCEDURES TO BE FOLLOWED

If you have a cesarean delivery and undergo randomization, you will have a 50% chance of getting a PICO bandage and 50% chance of getting a standard bandage to cover the wound. The decision for the standard bandage or the PICO bandage will be made randomly, like a coin flip. Each of these bandages are applied after the skin is closed and the operating time will not be increased or decreased. You will be evaluated every day during your hospitalization as you normally would. To assess your wound outcome, your hospitalization records will be reviewed, as will notes from your post operative and post partum visits. You will be seen at Tufts Medical Center 2 weeks after delivery for evaluation by a member of the wound team. You will receive a phone call to remind you about this appointment, and if you miss this appointment you will be called to reschedule. You will receive phone calls and be asked a series of questions about your incision at both 2 and 6 weeks post partum. Per routine obstetric care, you will have a 6 week post partum visit. For this visit you can follow up with an obstetrician at Tufts Medical Center or your primary obstetrician, and this may not be at Tufts Medical Center. Six weeks after delivery is the usual period of time that women are followed after having a baby. If you have any additional concerns about your wound outside of these outlined appointments you can call the Maternal Fetal Medicine clinic at Tufts Medical Center (617-636-8917) and an appointment will be arranged.

Even if you decide not to participate in the study, you could still receive either one of those bandages. Your doctor would decide which bandage you receive.

RISKS

There are no additional physical risks associated with study participation. All women undergoing cesarean delivery have the risk surgical site infections, seromas or hematomas requiring evaluation, skin blisters, scar separation, additional wound debridement, additional operating room management, or hospital readmission, among other surgical complications. We would like to know if the risk of wound complication depends on the type of bandage you receive. Since wound complications can occur after cesarean deliveries, women with either bandage will experience some of these complications.

Additionally, loss of confidentiality is a risk of study participation. Data collected from this study will be stored on a locked spreadsheet on a computer in a locked office at Tufts Medical Center. Paper records will be stored in a locked office at Tufts MC.

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BENEFITS
While there are no direct benefits to you from participating in this study, you will contribute to the knowledge of post-operative wound care and women in the future may benefit from what is learned.

ALTERNATIVES

The alternative is to NOT participate in the research study. Your medical care during your hospitalization will not change if you do not participate. If you chose not to participate, then you could receive either the standard bandage or the PICO bandage depending on the preference of your attending surgeon.

RESEARCH RELATED INJURY

Emergency medical treatment will be given to you if you are hurt or get sick as a direct result of being in this research study. You or your insurance carrier will be required to pay for any such medical care. Any needed medical care is available at the usual cost. All needed facilities, emergency treatment, and professional services are available to you, just as they are to the general public. The institution will not pay for your treatment if you become ill or injured as part of this study.

COSTS

There are no costs associated with this study. At this time, the hospital does not bill patients separately for the bandage placed at the time of cesarean delivery.

PAYMENT
You will not be paid for participating in this study.

PRIVACY AND CONFIDENTIALITY

Medical information, including wound complications, will be stored in a password protected document on a Tufts MC computer in a locked office. Paper records will also be stored in a locked office at Tufts MC. For analysis, data will be de-identified.

If you agree to take part in this research study, your personal information will not be given to anyone unless we receive your permission in writing. It will only be given if the law requires it. It will also only be given for regular hospital treatment, payment, and hospital management activities.

We will make every effort to keep your information private, but it cannot be completely guaranteed. The Institutional Review Board of Tufts Medical Center and Tufts University Health Sciences may check records that identify you. This might include your medical or

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research records and the informed consent form you signed. The records of this study might also be reviewed to make sure all rules and guidelines were followed.

A description of this clinical trial will be available on http://www.Clinical Trials.gov, as required by US Law. This Web site will not include information that can identify you. At most, the Web site will include a summary of the results. You can search this web site at any time.

AUTHORIZATION TO USE OR DISCLOSE YOUR IDENTIFIABLE HEALTH INFORMATION

If you sign this document, you give permission to the Principal Investigator named above and research staff at Tufts Medical Center as well as other individuals at Tufts Medical Center who may need to access your information to do their jobs (such as for treatment, payment (billing) or health care operations) to use or disclose (release) your health information that identifies you for the research study described above.

The parties listed in the preceding paragraph may disclose the health information described below to the following persons and organizations for their use in connection with the research study:

- Individuals or organizations working under the direction of the Principal Investigator(s) for the study,
- Outside individuals or entities that have a need to access this information to perform activities relating to the conduct of this research, such as analysis by outside laboratories on behalf of Tufts Medical Center.
- The Office for Human Research Protections in the U.S. Department of Health and Human Services, the United States Food and Drug Administration (FDA) and other federal and state agencies that have the right to use the information as required by law, and
- The members and staff of any Institutional Review Board (IRB) and Data and Safety Monitoring Board that oversee this study.

The health information that we may use or disclose (release) for this research study includes all information in your medical record related to the diagnosis and management of your post-operative course, including the record of your care, as well as any information collected or created during the course of this study.

Tufts Medical Center is required by law to protect your health information. By signing this document, you authorize Tufts Medical Center to use and/or disclose (release) your health information for this research. Those persons who receive your health information may not be required by Federal privacy laws (such as the Privacy Rule) to protect it and may share your information with others without your permission, if permitted by laws governing them. You may not be allowed to see or copy the information described on this form as long as the research is in progress, but you have a right to see and copy the information upon completion of the research in accordance with hospital policies.

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Tufts Medical Center may not withhold or refuse to provide you with clinical care based on whether or not you sign this form.

This authorization does not have an expiration date. You may change your mind and revoke (take back) this authorization at any time. Even if you revoke this authorization, this site's clinical, administrative and research staff may still use or disclose health information they already have obtained about you as necessary to maintain the integrity or reliability of the current research. To revoke this authorization, you must write to: HIPAA Privacy Officer for Research, 800 Washington Street, Box 5100, Boston, MA 02111. If you revoke this authorization, you may no longer be allowed to participate in the research described in this form.

WHOM TO CONTACT

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Documentation of Consent

I have been given a copy of this form. I have read it or it has been read to me. I understand the information and have had my questions answered to my satisfaction. I agree to take part in this study.

I understand that I will be informed of any new findings developed during the course of this research study that may affect my willingness to stay in this research study.

_____ _____
Date Participant's Signature

I have fully explained to _____ the nature and purpose of the above-described study and the risks that are involved in its performance. I have answered all questions to the best of my ability.

_____ _____
Date Principal Investigator or Representative's Signature

_____ _____ _____
Date Witness' Signature Witness Name

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