**STUDY OBJECTIVE:**

To evaluate the efficacy of an oxidized regenerated cellulose adhesion barrier (GYNECARE INTERCEED Adhesion Barrier) as an adjuvant in preventing postoperative adhesions in infertile women undergoing reconstructive surgery.

**METHODS:**

Women undergoing reproductive surgery were randomized to 1 of 2 groups:

- Surgical site completely covered with GYNECARE INTERCEED Adhesion Barrier (n = 23)
- GYNECARE INTERCEED Adhesion Barrier not applied (control group, n = 15).

**Study population**

The study included 38 women undergoing surgery between 1992 and 1995 that could be followed up for at least 2 years. Operations were all performed by laparotomy and included myomectomy (19), cystectomy (5), tuboplasty (10), and uteroplasty (4). There was no significant difference between the groups in surgical extent or intensity of preoperative adhesions.

**OUTCOMES MEASURED:**

- Pregnancy
- Presence of postoperative adhesions (assessed in 23 women undergoing second-look surgery)

**RESULTS:**

**Pregnancies**

- Twenty-five women (65.8%) became pregnant during the 2-year follow-up period
- A significantly greater proportion of the GYNECARE INTERCEED Adhesion Barrier group achieved pregnancy (78.3%) compared with the control group (46.7%, \( P < .049 \))

**Postoperative adhesions**

- Postoperative adhesions were observed in significantly fewer women in the GYNECARE INTERCEED Adhesion Barrier group (6 of 16) compared with the control group (6 of 7, \( P < .04 \))
- No significant difference was observed in intensity or extent of adhesions between the 2 groups

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**Key Takeaways**

The use of GYNECARE INTERCEED® Absorbable Adhesion Barrier as an adhesion barrier in reproduction surgery was associated with significantly higher pregnancy rates and a significantly reduced rate of postoperative adhesion formation compared with standard surgical procedures.

The higher rate of pregnancy in the GYNECARE INTERCEED Adhesion Barrier group may be explained at least in part by the reduction in postoperative adhesions.
Of 14 women who had no adhesions preoperatively, *de novo* adhesions were observed in 1 of 10 women in the GYNECARE INTERCEED Adhesion Barrier group (10%) and 3 of 4 women in the control group (75%)

Of 9 women who had preoperative adhesions that were lysed during surgery, postoperative adhesion reformation was found in 5 of 6 women in the GYNECARE INTERCEED Adhesion Barrier group (83.3%) and all 3 (100%) in the control group

**ADVERSE EVENTS:**

Ectopic pregnancies were observed in 2 women in the GYNECARE INTERCEED Adhesion Barrier group and 1 in the control group.

**STUDY LIMITATION:**

Small number of women included in the study.
GYNECARE INTERCEED® (TC7) ABSORBABLE ADHESION BARRIER

DESCRIPTION:
INTERCEED® (TC7) Absorbable Adhesion Barrier (Oxidized Regenerated Cellulose) is a sterile absorbable off-white knitted fabric prepared by the controlled oxidation of regenerated cellulose. It is stable and should be stored below 30°C (86°F).

ACTIONS:
INTERCEED Barrier reduces adhesion formation in gynecologic pelvic surgery by being applied dry to traumatized surfaces after meticulous hemostasis consistent with microsurgical principles to physically separate apposing tissue surfaces during the period of reperitonealization. When used as directed, INTERCEED Barrier is easy to apply and is absorbed from the site of implantation within four weeks. Absorption rate depends upon several factors including the amount used and implantation site. INTERCEED Barrier is chemically composed of oxidized regenerated cellulose which has been shown not to enhance bacterial growth.1

INDICATIONS:
GYNECARE INTERCEED® Absorbable Adhesion Barrier is indicated as an adjuvant in open (laparotomy) gynecologic pelvic surgery for reducing the incidence of postoperative pelvic adhesions after meticulous hemostasis is achieved consistent with microsurgical principles.

CONTRAINDICATIONS:
The use of GYNECARE INTERCEED® is contraindicated in the presence of frank infection. GYNECARE INTERCEED® is not indicated as a hemostatic agent. Appropriate means of achieving hemostasis must be employed.

WARNINGS:

The safety and effectiveness of INTERCEED Barrier in laparoscopic surgery or any procedures other than open (laparotomy) gynecologic microsurgical procedures have not been established.

Postoperative adhesions may be induced by INTERCEED Barrier application if adjacent tissues (e.g., ovary and tube) and structures are coapted or conjoined by the device, or if INTERCEED Barrier is folded, wadded or layered. Care must be taken to apply INTERCEED Barrier in single layers, interposed between adjacent anatomic structures at risk for adhesion formation. Postoperative adhesions may occur in the presence of INTERCEED Barrier if meticulous hemostasis is not achieved prior to application. INTERCEED Barrier must not be used if meticulous hemostasis has not been achieved or if blood contacts the product prior to its application. As with all foreign substances, INTERCEED Barrier should not be placed in a contaminated surgical site. The performance of INTERCEED Barrier at such a site has not been determined.

PRECAUTIONS:
Use only a single layer of INTERCEED Barrier, since multiple layers of packing or folding will not enhance the adhesion barrier characteristics and may interfere with the absorption rate of INTERCEED Barrier. Care should be exercised in applying INTERCEED Barrier to a pelvic organ not to constrict or restrict it. If the product comes in contact with blood prior to completing the procedure, it should be discarded, as fibrin deposition cannot be removed by irrigation and may promote adhesions formation. Ectopic pregnancies have been associated with fertility surgery of the female reproductive tract. No adequate and well controlled studies have been conducted in women who have become pregnant within the first month after exposure to INTERCEED Barrier. No data exist to establish the effect, if any, of INTERCEED Barrier on the occurrence of ectopic pregnancies. No teratogenic studies have been performed. Therefore, an avoidance of conception should be considered during the first complete menstrual cycle after use of
INTERCEED Barrier. The safety and effectiveness of using INTERCEED Barrier in combination with other adhesion prevention treatments have not been clinically established. INTERCEED Barrier is supplied sterile. As the material is not compatible with autoclaving or ethylene oxide sterilization, INTERCEED Barrier must not be resterilized. Foreign body reactions may occur in some patients. Interactions may occur between INTERCEED Barrier and some drugs used at the surgical site. Pathologists examining sites of INTERCEED Barrier placement should be made aware of its usage and of the normal cellular response to INTERCEED Barrier to facilitate proper evaluation of specimens.

ADVERSE REACTIONS:
The type and frequency of adverse events reported are consistent with events typically seen following surgery. Postsurgical adhesions may occur in the presence of INTERCEED Barrier. Possible reasons for adhesion formation include failure to achieve meticulous hemostasis, or conjoining or coapting adjacent structures with INTERCEED Barrier.

DIRECTIONS FOR USE:
1. To minimize the formation of postoperative adhesions and to optimize the performance of INTERCEED Barrier, the following surgical techniques, as appropriate, are recommended: use of magnification, use of fine caliber microsurgical instruments, use of fine suture material of low tissue reactivity, achievement of meticulous hemostasis, minimization of tissue handling, prevention of desiccation of tissues, avoidance of introduction of foreign bodies, such as talc, in the operative field and precise reapproximation of tissue planes.
2. Complete hemostasis must be achieved before application.
3. Remove all irrigation fluid and instillates from the peritoneal cavity. If Trendelenburg positioning is used, place patient in ReverseTrendelenburg position to remove as much of the irrigation fluid as possible from the cul-de-sac.
4. After complete hemostasis, the following steps are recommended in applying INTERCEED Barrier:
   a. Cut pieces of INTERCEED Barrier to desired size, which should be sufficient to completely cover the area at risk.
   b. Apply INTERCEED Barrier dry, in a single layer. It should be placed on and between raw (denuded) surfaces in order to mechanically prevent these areas from adhering to adjacent surfaces, thus minimizing resultant adhesion formation. Do not fold, wad, or apply multiple layers. Most importantly, do not conjoin or coapt adjacent structures within one layer (e.g. ovary and fallopian tube) as this will hold these surfaces together and may potentially promote adhesion formation. Since INTERCEED Barrier adheres well to serosal tissue, it is not necessary to suture in place. Moistening INTERCEED Barrier with 1 to 2 ml of irrigating solution after positioning will further ensure adherence and conformance of INTERCEED Barrier to the application site. If moistening is desirable, this should be done 1) only after INTERCEED Barrier is placed on the deperitonealized serosal area and 2) cautiously to keep the fabric from floating off the surface. If the latter occurs, the piece of INTERCEED Barrier should be discarded and a new piece used. If the product comes in contact with blood prior to use, it should be discarded, as fibrin deposition cannot be removed by irrigation and may promote adhesion formation.
   c. Hold INTERCEED Barrier in place at site of application to ensure adherence.
   d. INTERCEED Barrier should be applied just before closure of the surgical area in order to minimize possible dislodging during the remainder of the surgical procedure.
   e. Assess the site after INTERCEED Barrier application for discoloration of the device. INTERCEED Barrier that is dark brown or black indicates incomplete hemostasis. If discoloration occurs, it will occur within 1 to 2 minutes following application of INTERCEED Barrier. This will render the product ineffective as an adhesion barrier and may promote adhesion formation. Should this discoloration occur, remove INTERCEED Barrier and achieve hemostasis. Apply new piece of INTERCEED Barrier as specified above. REFER TO WARNINGS.

HOW SUPPLIED:
INTERCEED Barrier is available in one size 3 x 4 inches (7.6 cm x 10.2 cm) in sterile foil envelopes.

CAUTION:
Federal law restricts this device to sale, distribution or use by or on the order of a physician.

CLINICAL STUDIES:

Laparotomy
A multicenter clinical investigation was conducted in gynecology patients undergoing open laparotomy with adhesions on both sidewalls of the pelvis. This allowed each patient to serve as her own control. The study employed a blinded randomization as to which sidewall was treated, followed by an “open label” treatment with INTERCEED Barrier. INTERCEED Barrier was applied to the denuded parietal peritoneum of the pelvic sidewall only. The incidence of adhesions which formed after adhesiolysis and reconstructive pelvic surgery was determined by a “second-look” laparoscopy. INTERCEED Barrier significantly reduced the incidence of adhesions between the ovary and pelvic sidewall.

Laparoscopy
A company-sponsored, U.S., multi-center, randomized, parallel-group, controlled clinical trial of INTERCEED Barrier in laparoscopic surgery in patients with extensive adhesions due to endometriosis, showed a statistically significant (p-value <0.05) increase in adhesion formation at “second-look” laparoscopy for the intent-to-treat INTERCEED Barrier group, in which 100% of subjects (19/19) had adhesions, compared to the no-barrier treatment surgical control group, in which 76% of subjects (16/21) had adhesions. Also, the primary end-point of percent adhesion free sites score at “second-look” laparoscopy was statistically significantly (p-value <0.05) lower for the INTERCEED Barrier group (27%) than for the no-barrier treatment surgical control group (44%). Possible contributing factors for the increase in adhesions were conjoining and coaptation of adjacent surgically traumatized structures (e.g., ovary with fallopian tube). Limited experience outside the U.S. previously demonstrated potential benefit of laparoscopic application of INTERCEED Barrier.

REFERENCES: