Clinical Experience With An Absorbable Subcuticular Skin Stapler In Obstetric & Gynecologic Surgery

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Summary

We have evaluated a novel absorbable subcuticular skin stapler to determine its clinical performance in terms of safety, efficacy and cosmesis. Our experience included over 400 obstetric and gynecologic surgical patients. The resultant incisional closures were observed immediately post-surgery and generally at six weeks with select observations at one year. The absorbable staples demonstrated equivalent efficacy compared to metal staples and subcuticular suturing. Typical closures were closely approximated with good eversion and no apparent inflammatory reaction. Use of the absorbable staples resulted in low maintenance wounds with an observed improved cosmesis. In a limited number of patients with scars from prior surgeries, we observed a significant reduction in reformation of hypertrophic scars and keloids. We found the use of the device to be simple, comfortable and time-effective. In addition, the use of the absorbable subcuticular skin staple eliminated the cost and patient discomfort and anxiety associated with the post-operative removal of metal skin staples. Overall, our patients expressed a high degree of satisfaction with the absorbable staple closure.

Introduction

The objectives of skin closure are safe, effective healing with good cosmetic results. Effective time utilization of health care professionals in the surgical suite and post-operatively can be a determining factor in the selection of a closure modality. A number of skin closure techniques are available, including a variety of suture materials, metal skin staplers, tissue glues and adhesive dressings. We evaluated this new mechanical skin closure modality to determine its effectiveness in our surgical practice.

Materials and Methods

We utilized a new absorbable subcuticular skin stapler (INSORB® Subcuticular Skin Stapler, Incisive Surgical, Inc., Plymouth, MN) to close various obstetric and gynecologic abdominal incisions at Fairview Health Systems Hospitals (Edina, MN and Burnsville, MN). The stapler is a sterile, single patient use device that contains 25 absorbable staples. The device utilizes a novel method which presents the dermis and then places an absorbable staple in a horizontal, subcuticular, and interrupted manner to provide a secure well-approximated, everted closure. The absorbable staples are made of a polylactide-polyglycolide co-polymer with an established history in wound closure. The staple design features a U-shaped curvature with cleats at the two distal ends to secure the subcuticular tissue.

Midline Incision

INSORB Staples

Metal Staples

At Surgery

INSORB Staples

Metal Staples

At 1 Week

We used a new double Adson forceps (INSORB|1 Forceps) which allows a single clinician to approximate tissue and fire the stapler. The technique involves sequentially grasping the opposed wound edges and mating the forceps with the stapler over a needle path where tissue is captured bilaterally. As the stapler lever is advanced, the tissue is compressed into the needle path. Two surgical needles then advance to capture a precise ‘bite’ of dermis on both sides of the incision simultaneously and deploy a staple horizontally into the subcuticular tissue. The cleats of the staple secure the tissue. The absorbable staples were placed at approximately 7 mm intervals. Standard adhesive strips were used on the closure for wound protection.
Results

We utilized a new skin closure technique with this subcuticular stapler to present a thinned wall of dermis to the stapler prior to staple placement. Although this technique was somewhat different from the placement of metal skin staples, it was easily adopted by the surgeon and staff. The device was simple to use. We found that, with experience, closure times with the subcuticular skin stapler closely approximated closure times with a metal skin stapler and was significantly faster than subcuticular suture closures. The use of the absorbable subcuticular skin staples resulted in a very uniform interrupted, everted skin closure without percutaneous tissue insult.

We have had experience with over 400 patients with the absorbable subcuticular stapler and have observed no infections, only 1 hematoma and 1 seroma to date. Overall, the wounds closed with the absorbable staples were low maintenance wounds. Further clinical experience is necessary to determine if this experience may be due to the interrupted nature of the absorbable subcuticular skin staples or other factors. In addition, the use of the absorbable stapler eliminates the potential of needlesticks.

The absorbable subcuticular skin staples demonstrated equivalent efficacy compared with metal skin staples and subcuticular suturing. We found a remarkable decrease in tissue irritation over the incisional areas closed with absorbable staples compared to closures with metal staples, with significantly improved cosmesis and patient satisfaction. The use of the absorbable subcuticular skin stapler eliminated the cost, inconvenience and patient discomfort associated with post-operative removal of metal staples.

We have observed a limited number of patients who experienced a hypertrophic scar or keloid formation in previous surgeries. In this small patient population, we have noted a remarkable reduction in the reformation of hypertrophic scars or keloid formations.

Conclusions

It has long been understood in the medical community that the optimal skin closure technique results in secure closure with minimal tension on the wound edges with good eversion and approximation. The use of the absorbable subcuticular stapler resulted in secure, interrupted, everted skin closure. Postoperatively the incisions show a notable lack of inflammation, while patients express less discomfort and anxiety than was associated with metal skin staples. We have seen a very good cosmetic outcome - observed as a thin flat scar with minimal pigmentation and no staple tracks. In a limited number of patients with scars from prior surgeries, we observed a significant reduction in reformation of hypertrophic scars and keloids. We found that the speed of the subcuticular stapler is similar to that of metal skin staples, and faster than subcuticular suturing, reducing operating room times. Use of the absorbable staples resulted in reduced wound complications, low maintenance wounds, and the elimination of needlesticks and metal staple removal.

Our initial experience suggests that the use of absorbable subcuticular skin staples is significantly preferred by patients and is a superior alternative to metal skin staples and subcuticular suturing.