Experience with a Novel Absorbable Subcuticular Skin Stapler In General Surgery

Nancy Guttormson, M.D., F.A.C.S., James H. Andrisevic, M.D., F.A.C.S., Fairview Hospitals, Minneapolis, MN

Summary

We have evaluated a novel absorbable subcuticular skin stapler to determine its clinical performance in terms of safety, efficacy and cosmesis in a range of typical general surgical procedures, including thoracotomies, mastectomies, cholecystectomies, and abdominal midline incisions. This experience includes the use of the absorbable staple for immediate primary closure of contaminated wounds that would have otherwise been managed by delayed primary closure. Our experience involves over 200 patients in over four years. The wound closures were observed immediately post-surgery and generally at one week follow-up visits. 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. We found the use of the device to be simple, time-effective, and a truly single-operator closure technique. In addition, the absorbable subcuticular skin staple was more comfortable and acceptable in appearance to the patients than metal staples, while also eliminating the inconvenience, cost, anxiety, and discomfort of staple removal. We have been especially pleased with the cosmetic outcome and reduced complications of these closures, and our patients have expressed a high degree of satisfaction with the absorbable staple closure.

Introduction

The objectives of surgical wound 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 incisional 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 an absorbable subcuticular skin stapler (INSORB® Subcuticular Skin Stapler, Incisive Surgical, Inc., Plymouth, MN) to close general surgical incisions at two Fairview System Hospitals (Minneapolis, MN).

The stapler is a sterile, single patient use device that contains 25 absorbable staples. The device utilizes a novel method which precisely presents the dermis and then places an absorbable staple in a horizontal, subcuticular, and interrupted fashion 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.
Results

The device is ergonomically designed and 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.

Increased wound drainage is apparent with these closures, often seen as wetter dressing at the first dressing change. There is no apparent inflammatory response and this drainage is likely permitted by the interrupted placement of these staples and the absence of compression as seen with external metal staples. Studies have found reduced inflammatory response and infection with the absorbable staples when compared to suture and metal staples. Compared to Vicryl™ for the closure of contaminated wounds the INSORB staples produce a significantly (p=0.009) lower incidence of infection.

We have had experience with over 200 patients with the absorbable subcuticular stapler and have observed a reduced incidence of infections, hematomas or seromas. Our observations and other studies suggest that this closure modality may be an optimal modality for contaminated wounds.

We have used the absorbable staples for immediate primary closure of contaminated wounds that would have otherwise been managed by delayed primary closure. These closures have healed without further intervention or complications.

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 incision areas closed with absorbable staples compared to closures with metal staples or suture, and a reduced incidence of wound complications, with significantly improved cosmesis and patient satisfaction. This modality may be a reasonable alternative to delayed primary closure of contaminated wounds. The use of the absorbable subcuticular skin stapler eliminated the cost, inconvenience, and patient discomfort associated with post-operative removal of metal staples.

Conclusions

It is understood that an optimal skin closure is secure, uniform approximation with eversion and minimal tension on the wound edges. The use of absorbable skin staples resulted in a rapid and simple method of closure with the additional advantage of minimal wound care. Productivity in the surgical suite, as well as on the hospital floor and clinic, is a subject of increasing interest.

The absorbable subcuticular skin stapler provided a uniform, everted skin closure in an interrupted manner, without the percutaneous tissue insult associated with metal skin staples. Our clinical results indicate that the incision closures are equivalent to metal skin staples and subcuticular suturing with respect to efficacy. 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 postoperative complications, low maintenance wounds, and the elimination of staple removal. Our patients expressed a high degree of satisfaction with the wounds closed by the absorbable staples.

Our experience has shown that the use of absorbable subcuticular skin stapler results in a high degree of patient satisfaction and may be a preferred alternative to metal skin staples and subcuticular suturing. This experience also suggests that the absorbable staple may be an optimal modality for the closure of contaminated wounds.

This paper was published by Incisive Surgical, Inc., Plymouth, MN © 2009 Incisive Surgical, Inc. All rights reserved.

1 Comparison of Gross and Histologic Tissue Responses of Skin Incisions Closed by Use of Absorbable Subcuticular Skin Staples, Cutaneous Metal Staples, and Poligleactin Suture in Pigs”, JL Fick, et al, University of Minnesota School of Veterinary Medicine, American Journal of Veterinary Research, November 2005.