

Use of Barbed Suture for Wound Closure in Electrophysiology Device Procedures

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Abstract

Background: Barbed suture use in surgical fields such as gynecology and orthopedic surgery has been associated with faster wound closure, improved cosmesis, increased cost-effectiveness and potentially decreased rates of infection. However, the use of barbed suture in electrophysiology device procedures has not been reported.

Objective: This study aims to (1) investigate the safety and effectiveness of barbed suture in wound closure in patients after EP implantable cardioverter defibrillators and loop recorders (CIED) procedures, (2) to determine whether these sutures have an advantage in device implant procedures by improving incision integrity, (3) and to find out whether these sutures would potentially lead to lower rates of infections compared to non-barbed sutures.

Methods: We retrospectively compared the closure success and complications in 413 patients undergoing CIED procedures without Quill sutures and with Quill sutures. The primary outcome was closure success and pocket infection/dehiscence within 3 months of CIED.

Results: Of the 413 patients who were followed up in 3 months, there was a non-significant trend toward a lower infection rate with barbed versus non-barbed suture 1.31%, vs 1.63% $p=0.78$.

Conclusions: This study confirms the safety and usefulness of barbed suture material for wound closure during CIED procedures.

Introduction

Electrophysiology devices include pacemakers, implantable cardioverter defibrillators and loop recorders (CIED). These devices are usually implanted surgically into the subcutaneous space. The surgical wound is then closed by primary intention in multiple layers using various suture materials. A good approximation of the incision is needed to reduce the risk of wound dehiscence, infection or hematoma. The Quill™ Device (Quill Surgical Specialties Corporation, Reading, PA) is a barbed suture often used to close surgical incisions after gynecologic and orthopedic procedures [Figure 1]. Barbed suture use in these surgical fields is reportedly associated with faster wound closure, increased cost-effectiveness and uniform distribution of tension across the suture line.^{[1],[2]} The latter being less likely to lead to complications of dehiscence and hematoma.^[2]

The use of barbed suture in EP device procedures has not been reported. We investigated the effectiveness of this suture on wound closure in patients after CIED procedure to ascertain whether these sutures may have an advantage in device implant procedures.

Methods

To assess the usefulness of this suture material during CIED we retrospectively compared the closure success and complications

in patients undergoing CIED at SUNY Downstate from January 2006 – May 2011 (without Quill sutures) and June 2011 - July 2014 (with Quill sutures). A single operator was involved in all implants. In addition to oral antibiotics for 5 days all the patients received IV antibiotics peri-procedurally, which were either cefazolin 1-2 gm or clindamycin 600 mg. The breakdown by the type of the procedure is shown in [Table 1].

We have identified charts of 413 patients who underwent CIED (de-novo, upgrades and replacements) in our institution. Data was collected based on demographics (age, gender) and presence of infection in the 3-month post operative period. The primary outcome was closure success and pocket infection/dehiscence within 3 months of CIED.

Results

After the procedure, 413 patients were followed up in 3 months. Barbed sutures (Quill Surgical Specialties Corporation, Reading, PA) were used in 229 patients, and non-barbed sutures were used in 184 patients. In both groups pocket closure was successful. There was a non-significant trend toward a lower infection rate with barbed versus non-barbed suture 1.31%, vs 1.63% $p=0.78$ [Figure 2].

Subgroup analysis demonstrated that out of the 3 infected barbed sutured wounds, all infections occurred in women and no barbed sutured wound infection was found in men. Out of the 3 infected non barbed sutured wounds, 2 infections occurred in men and 1 in a woman. But, additionally, out of the 3 infected barbed sutured wounds, 2 infections occurred in individuals younger than 65 while 1 occurred in an individual older than 65. Likewise, for the 3 non barbed sutured infected wounds, 2 infections occurred in patients younger than 65 while 1 occurred in a patient older than 65. Hence,

Key Words

CIED, barbed suture, device implantation.

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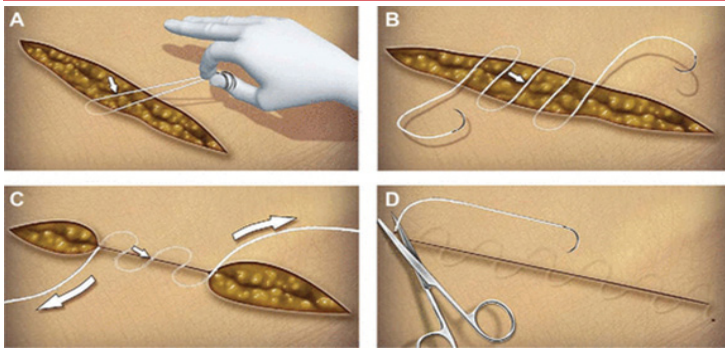


Figure 1: Displays how barbed suture is used to close surgical wounds^[3]

Table 1: Breakdown of CIED procedures.

Procedure Type	Barbed suture	Non-Barbed suture	P
ICD	35.3 %	39.8 %	NS
PM	28.2 %	27.0 %	NS
CRT	17.9 %	17.3 %	NS
Upgrade	11.9 %	12.8 %	NS
Generator change	5.8 %	2.6 %	NS
ILR	.2 %	.51 %	NS

patients under 65 years of age had higher infection rates.

Discussion

Our study shows similar rates of infection in barbed and non-barbed sutures. Varied results have been reported in prior studies. Some suggested that the use of barbed sutures is associated with decreased rates of infection compared to traditional sutures. Others found no difference in the infection rate, cosmesis and dehiscence relative to conventional suture.^{[5],[7],[8]} Barbed sutures allow for a uniform distribution of tension across the suture line, [Figure 1] which is posed to decrease wound dehiscence and hematoma.^[2]

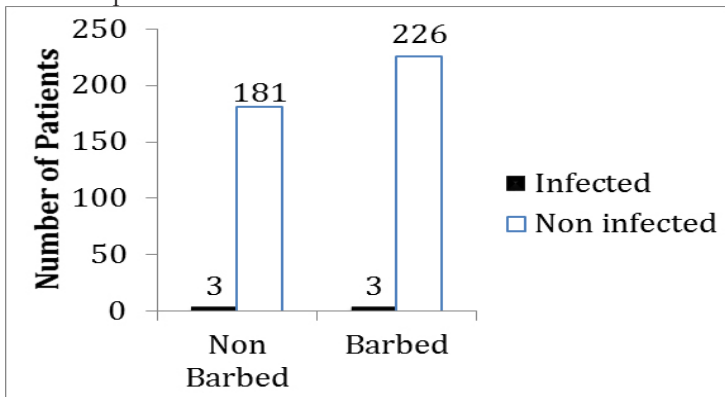


Figure 2: The infection rates.

This may particularly be useful for CIED procedures since the bulk of the implanted device may cause tension during wound closure. In our casual experience these sutures do extremely well in closing wounds in patients following device extractions in which significant skin necrosis and infection require wide margin resection. Barbed suture eliminates the need for knot tying, which allows for faster and lesser wearisome wound closure, and may decrease the risk of glove perforation for the operator during knot tying. Finally, our infection rates 1.63% were similar to previously published ones. The national average (1.61%),^[4] confirmed the safety and usefulness of this suture

material for wound closure during CIED procedures.

Conflict Of interests

None.

Disclosures

None.

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