

# Comparison of Infection Incidence Between Appendectomy Skin Incisions Sutured by Nylon and Polyglactin (Vicryl)

Alireza Golchini,<sup>1</sup> Habib Alah Nikzad Jamnani,<sup>1</sup> Sajjad Ahmadi,<sup>1</sup> Elham Karimi,<sup>2</sup> Saeedeh Pourahmad,<sup>1</sup> Ali Reza Safarpour,<sup>1</sup> Zahra Zabangirfard,<sup>1</sup> and Leila Ghahramani<sup>1,\*</sup>

<sup>1</sup>Colorectal Research Center, Shiraz University of Medical Sciences, Shiraz, IR Iran

<sup>2</sup>Department of Surgery, Nursing Faculty, Shiraz University of Medical Sciences, Shiraz, IR Iran

\*Corresponding author: Leila Ghahramani, Colorectal Research Center, Shiraz University of Medical Sciences, Shiraz, IR Iran. Tel: +98-7136281453, E-mail: colorectal2@sums.ac.ir

Received 2015 May 24; Revised 2015 July 20; Accepted 2015 July 24.

## Abstract

**Background:** Suturing quality and reducing its complications and resulting infection have always been a major concern of surgeons. Many of them have prohibited applying polyfilament and absorbable suturing materials.

**Objectives:** In this study, we compared skin wound infection rate and other complications in two groups of post appendectomy patients whom were treated with two types of suturing materials - conventionally used Nylon and absorbable braided polyglactin (Vicryl) - and wound healing, existence of complication and recovery course of treated patients were surveyed.

**Patients and Methods:** A total of 130 patients who underwent appendectomy were divided into two groups of 645 members, each. Patients in group A had their incisions closed by separate sutures (mattress method) by vicryl, while patients in group B had their surgical incisions were closed in the same method, by nylon sutures. Any signs and symptoms of surgical site wound infection like inappropriate pain, redness, discharge, bulging, and unhealing wound were checked during hospital stay and on the 7<sup>th</sup>-9<sup>th</sup> day postoperatively.

**Results:** The postsurgical complication and infections rates were similar between the two groups.

**Conclusions:** Vicryl sutures can safely be used for skin and subcutaneous wound suturing even when our surgery site is not ideally clean.

**Keywords:** Polyglactin 910, Wound Infection, Sutures

## 1. Background

Surgical wound healing, complication reduction and improving the suturing quality represent major challenges in the surgical literature and have been debated extensively. Finding an optimal suturing material, with minimum risk of infection and better healing and cosmetic results, has always been a concern for all surgeons. Wound complications may be present in a short time, after surgery (e.g. hematoma or detachment of sutures), and are mostly due to technical error and surgeons' fault to stop the bleeders properly and not paying proper attention or due to lack of experience.

Several of the complications occur a few days after surgery. Wound infection, and subsequent wound dehiscence, is the most common of this group and its incidence is mostly related to patients' medical conditions and suturing materials and devices quality. Wound infection is caused by a variety of organisms, although, typically by gram positive cocci in skin infections of normal patients and gram negatives and anaerobic bacteria in gastrointestinal surgeries and immune deficient patients.

The majority of surgeons are reluctant to use newer and, naturally, less tested suturing materials, especially the polyfilament absorbable sutures, implying a potentially

higher risk of infection and less compatibility to tissue (1). However, several studies have shown no significant differences in wound healing process (cosmetic, infection rate, and cost) between absorbable and non-absorbable sutures (2-5).

Despite the comfort quality of polyfilament absorbable sutures, like polyglactin, many training surgeons are prohibited by surgeon mentors and instructors to use them for outer skin sutures, by concerning about their high risk of infection because they may represent a better place to nest the pathogens.

Applying the vicryl sutures for skin incisions is a surgical taboo among the many training hospitals, despite the numerous studies that have demonstrated the safety of using them and the convenience that has been reported in several others (6, 7). Appendectomy has been one of the common surgical interventions that are frequently performed in different parts of the world, in the same method, and this procedure is not clean.

## 2. Objectives

In this study, we aimed to precisely estimate the potential hazard of using polyglactin, commercially named

vicryl in appendectomy skin incisions, which are not typically clean surgical wounds.

### 3. Patients and Methods

This clinical study was performed in Namazee and Shahid Faghihi hospitals, which are two affiliated hospitals of Shiraz Medical University, Shiraz, Iran, between January 2014 and January 2015. This was a parallel randomized clinical trial. The scientific committee of Shiraz University of Medical Sciences, Shiraz, Iran, approved this study and the informed consent was obtained before enrolment. The registration number of this study is: IRCT 201501179936N10.

Sample size was calculated by the formula of comparison of two ratios (65 in each group). Study was designed to evaluate the post appendectomy wound infection rate in the two groups; patients in group A, whose McBurny's incisions were closed by separate sutures (mattres method) by vicryl (Ethicon Inc., Somerville, NJ, USA), and patients in group B whose surgical incisions were closed by the same method, with nylon sutures (Ethicon Inc., Somerville, NJ, USA). After permuted randomizations, 200 cases were eligible to participate in the study. Among them, 188 patients replied to our investigators and, finally, 130 participants were included in the survey (65 in each group).

The patients who underwent open appendectomy with McBurny's incisions included male and female, between 18 - 65 years old, in each group. After appendectomy, abdominal wall layers were sewed by absorbable sutures in both groups. In group A, skin incision was closed by 3/0 vicryl separate mattress sutures, while in the group B, skin incisions were closed by the conventional 3/0 nylon separate sutures. Simple routine irrigation and dressing were also applied. All patients received prophylactic antibiotics (Metronidazole 500 mg).

Exclusion criteria were the patients with perforated appendicitis, patients with underlying medical diseases, such as diabetes mellitus, immune deficiencies, BMI more than 40 and patients with past medical history of excessive scar of keloid formation. During the hospital course, all the patients were examined by the general surgery residents and probable surgical site infection were checked. After being discharged from hospital, they were seen again in the 7<sup>th</sup> - 9<sup>th</sup> day post-operation by the consultant surgeons.

If a patient refused, or was unable to come to clinic, he or she was excluded from study. Any signs and symptoms of surgical site wound infection, like inappropriate pain, redness, discharge, bulging, and unhealing wound were reported in their data collecting forms. The SPSS version 16.0 (SPSS Inc., Chicago, IL, USA) was used for analyzing data.

### 4. Results

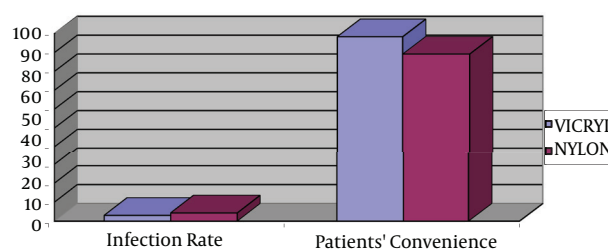
Totally, 64 males and 66 females were included in this study. The mean age of male patients was  $27.67 \pm 8.36$  and

the mean age of female patients was  $28.35 \pm 8.33$  years. There was no significant difference ( $P = 0.76$ ).

Two of the 65 patients in group A showed skin infection (3%) and there were three cases with surgical site infection of the 65 patients in the group B (4.3%), although there was no significant statistically change between groups in relation wound infection ( $P = 0.67$ ).

Partial wound disruption was observed in one patient in each group (1.5%) that seemed to be resulted from surgical technical errors. (Figure 1). Patients' satisfaction of wound healing and their convenience were recorded to be 64 of 65 (98.4%) in group A and 58 of 65 (89.2%) in group B (Figure 1).

The mean lengths of hospital stay were  $38.53 \pm 8.05$  hours in group A and  $32.55 \pm 9.70$  in group B (Table 1). Although these were significant differences ( $P < 0.001$ ), however, they seemed not to be related to type of suture or any surgical site infection.



**Figure 1.** Infection Rate (Two Left Columns) and Patients' Convenience Rate (Two Right Columns) Percentage in Vicryl and Nylon Groups

**Table 1.** Hours of Hospital Stay and Number of Complication in the Two (Vicryl and Nylon) Groups

Group	Hours of Hospital Stay	Wound Complication Rate
VICRYL	32.5	3 (including 2 skin infections)
NYLON	38.5	4 (including 3 skin infections)

### 5. Discussion

Despite the presumption of raised incidence of skin infection and other complications, like wound dehiscence and inconvenience caused by polyfilament absorbable suture, there no significant change in surgical site wound infection in closure of McBurney's appendectomy incisions.

Patients' convenience and satisfaction were not different in both groups, as well. Therefore, vicryl suture is a viable alternative to nylon suture, in the repair of non-clean appendectomy incisions. Using the polyfilament absorbable sutures for the suturing of skin has been a surgical taboo among surgeons, who believe that these types of sutures lead to more infection because they are much easier inhabited by bacteria and infection accu-

mulations (8). Several studies showed no clinically significant difference in surgical site infection. In addition, cosmetic results have been similar in the two types of suturing materials (8-10). Many surgeons are reluctant to use absorbable vicryl sutures, because they are concerned about the suboptimal results, abnormal skin inflammatory response and early suture dehiscence (11, 12).

On the other hand, using the same sutures that are used for closure of other abdominal wall layers, such as fascia or sub cutaneous tissue, will be economically beneficial. Most of the similar studies pay attention to cosmetic results, surgical site infection and wound complications (5). However, in this study, we could not compare the cost effectiveness of type of suture materials. The limitation of this study is the low sample size, because of restricted eligibility criteria.

In addition, patients were often reluctant to return for follow-up. Another limitation is the lack of subjective documents for evaluation the wound healing process (e.g. digital photographic comparison). However, to our knowledge, this study is the first randomized clinical trial for comparison of the incidence of surgical site infection between absorbable and non-absorbable suturing of non-clean appendectomy site. In addition, there is no study investigating the satisfaction and the convenience feeling of patients, who underwent closure of skin by absorbable versus non-absorbable suturing materials.

## Footnotes

**Authors' Contributions:** Alireza Golchini: Executor surgeon, data collection, writing manuscript, Habib Alah Nikzad Jamnani: executor surgeon, data collection, Sajjad Ahmadi: executor surgeon, data collection, Elham Karimi: photographer, data collection. Saeedeh Pourahmad: acquisition and analysis of data, Alireza Safarpour: acquisition and analysis of data, Zahra Zabangirfard: final submission, Leila Ghahramani: chief conductor, study leadership, main editor.

## References

1. Szabo S, Istvan G. [Skin closure in inguinal hernia repair with rapidly absorbing Polyglactin 910/370 (Vicryl-Rapide) suture material]. *Magy Seb.* 2002;**55**(2):77-80.
2. Missori P, Polli FM, Fontana E, Delfini R. Closure of skin or scalp with absorbable sutures. *Plast Reconstr Surg.* 2003;**112**(3):924-5.
3. Harimoto N, Shirabe K, Abe T, Yukaya T, Tsujita E, Gion T, et al. Prospective randomized controlled trial investigating the type of sutures used during hepatectomy. *World J Gastroenterol.* 2011;**17**(18):2338-42.
4. Gabel EA, Jimenez GP, Eaglstein WH, Kerdel FA, Falanga V. Performance comparison of nylon and an absorbable suture material (Polyglactin 910) in the closure of punch biopsy sites. *Dermatol Surg.* 2000;**26**(8):750-2.
5. Karounis H, Gouin S, Eisman H, Chalut D, Pelletier H, Williams B. A randomized, controlled trial comparing long-term cosmetic outcomes of traumatic pediatric lacerations repaired with absorbable plain gut versus nonabsorbable nylon sutures. *Acad Emerg Med.* 2004;**11**(7):730-5.
6. Sonmez K, Bahar B, Karabulut R, Gulbahar O, Poyraz A, Turkyilmaz Z, et al. Effects of different suture materials on wound healing and infection in subcutaneous closure techniques. *B-ENT.* 2009;**5**(3):149-52.
7. Basiri A, Sarhangnejad R, Ghahestani SM, Radfar MH. Comparing absorbable and nonabsorbable sutures in corporeal plication for treatment of congenital penile curvature. *Urol J.* 2011;**8**(4):302-6.
8. Gammelgaard N, Jensen J. Wound complications after closure of abdominal incisions with Dexon or Vicryl. A randomized double-blind study. *Acta Chir Scand.* 1983;**149**(5):505-8.
9. Shetty AA, Kumar VS, Morgan-Hough C, Georgeu GA, James KD, Nicholl JE. Comparing wound complication rates following closure of hip wounds with metallic skin staples or subcuticular vicryl suture: a prospective randomised trial. *J Orthop Surg (Hong Kong).* 2004;**12**(2):191-3.
10. Mingmalairak C, Ungbhakorn P, Paocharoen V. Efficacy of antimicrobial coating suture coated polyglactin 910 with triclosan (Vicryl plus) compared with polyglactin 910 (Vicryl) in reduced surgical site infection of appendicitis, double blind randomized control trial, preliminary safety report. *J Med Assoc Thai.* 2009;**92**(6):770-5.
11. Ciampolini J, Boyce DE, Shandall AA. Adult hernia surgery in Wales revisited: impact of the guidelines of The Royal College of Surgeons of England. *Ann R Coll Surg Engl.* 1998;**80**(5):335-8.
12. Luck R, Tredway T, Gerard J, Eyal D, Flood L, Flood R. Comparison of cosmetic outcomes of absorbable versus nonabsorbable sutures in pediatric facial lacerations. *Pediatr Emerg Care.* 2013;**29**(6):691-5.