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Full Length Research Paper

Ethil-cyanoacrylate use for skin closure in patients subjected to laparoscopic cholecystectomy

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One of the main factors limiting the use of cyanoacrylate is its high cost. Despite the relatively small amount of literature on this subject, we have been able to demonstrate their safe use in skin closure. Objective: To compare the cyanoacrylate adhesive with the usual techniques of skin closure with surgical thread, assessing its final aesthetic effect and possible complications. Materials And Methods: We studied 126 patients from the Department of General Surgery, Hospital Regional de Mato Grosso do Sul in the period from February to October 2009. All patients were randomized immediately before starting the surgery and were divided into two groups: Group 1: 64 patients underwent laparoscopic cholecystectomy and skin closure with surgical thread - Group 2: 62 patients underwent laparoscopic cholecystectomy and skin closure with cyanoacrylate adhesive low cost - Superbonder ®. Results: We evaluated 126 patients, mostly female (N = 113).The mean age was 45 years, ranging between 19 and 83 years. Only group 1 had infection (N = 3) and dehiscence (n = 1) surgical wound. Group 2 had 2 cases of seroma versus 1 patient in group 1. The operative time was shorter in group 2 - on average 80.9 minutes versus 94.14 minutes in group 1. Conclusion: The use of ethyl cyanoacrylate (Superbonder ®) had lower rates of infection and wound dehiscence when compared to with nylon 4-0, in addition to shorter operative time. Costs were higher, but still within the acceptable, which makes this a good choice for adhesive skin closure in laparoscopic surgery elective.

Keywords: cyanoacrylates, laparoscopic cholecystectomy, sutures, skin.

INTRODUCTION

The cyanoacrylate was developed in 1949 (Ardis, 1949). It is a liquid monomer that polymerizes in an exothermic reaction when in contact with fluid or basic substances, forming a strong adhesive when applied to the skin. In 1959 was developed by Coover based adhesive of this substance and since the 60's it has been used in bucomaxilofacial surgery (Carvalho et al, 2006; Handschel, 2006) and many medical specialties. The advantages of using cyanoacrylate compared to suture materials are varied. Among them is the operative time decreasing, antimicrobial activity in vitro and in vivo, painless and easy learning technique. However, one of the major limiting factor of use is the high cost (Bozkurt, 2008). There are glues on the market for low cost which have the same basic component of the cyanoacrylate, as the ethyl-cyanoacrylate (Superbonder ®). Based on this, there are recent studies testing its applicability in surgical practice. Some of these studies have shown that this substance has also antimicrobian effect (Manzano et al, 2006; Ueda et al, 2004). Thus, despite the still poor literature related to this subject, there are some researchs demonstrating the safe use of cyanoacrylate-based adhesive, especially in the treatment of cornea perforation and cornea closure (Lin et al, 1988), skin (Handschel, 2006; Bozkurt et al, 2008; Nahas et al, 2004; Rimmer et al, 2006; Shamiyeh et al, 2006; Sebesta et al, 2003; Singer et al, 2008; Blondeel et al, 2004; Ridgway et al, 2007; Couthard et al, 2002), and especially in plastic surgery (D'assumpção 2008; Nahas et al, 2004; Gennari et al, 2004).

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Tabe 1. Complications presented at postoperative time in the groups 1 and 2.

Complication	Number of patients that presented complications	
	Group 1	Group 2
Seroma	1	2
Infection	3	0
Dehiscence	2	0
Total	7	2

OBJECTIVE

To compare the cyanoacrylate adhesive with the usual techniques of skin closure with surgical thread, assessing its final aesthetic effect and possible complications.

MATERIALS AND METHODS

The study was approved by the Ethics Committee of the Hospital Regional de Mato Grosso do Sul, through comprehensive information on the study for the patient signing the consent form. There was no conflict of interest. We studied 126 patients from the Department of General Surgery, Hospital Regional de Mato Grosso do Sul, in Campo Grande, Brazil, diagnosed with Cholelithiasis undergoing laparoscopic cholecystectomy Period of evaluation from February to October 2009. Inclusion criteria: patients submitted to elective laparoscopic cholecystectomy, over 18 years old, no other scars, with no signs of acute cholecystitis and other gallbladder diseases (except calculous chronic cholecystitis). Exclusion criteria: patients younger than 18 years old, operated in an emergency with acute cholecystitis, empyema, cancer, patients in whom there was need for exploration of the biliary tract, undergoing multiple procedures in the same surgery, pregnant women and those who did not accept participation.

Patients who agreed, after having signed an informed consent were randomized by sortition minutes before the start of the operation and distributed into two groups: Group 1: skin closure achieved with simple points separated with mononylon 4-0; Group2: closure of the skin with ethyl-cyanoacrylate (Superbonder ®).

The tubes of adhesive glue were sterilized with ethylene oxide and used only one tube for each patient, and discarded the remains. Patients in both groups were submitted to the closure of aponeurosis with simple running suture with polyglycolic acid (Vycril ®) number 0 and continuous subdermal suture wire Poliglecaprone 25 (Monocryl ®) 4-0 for approximation of wound edges. Then, in group 1, the skin was closed with nylon 4-0 simple points. In Group 2, the wound edges were approximated manually and the glue was applied over the incision. Both groups performed is then closed dressing, which was removed on the first postoperative day. Since then, the patient was asked to make local hygiene with soap and water, without applying any antiseptic product. We compared groups with respect to cosmetic results and complications such as wound infection and dehiscence of the closure between the groups, through evaluations conducted in 15th and 45th postoperative days.

RESULTS

Twenty six patients was excluded from a total of 152, six for not attending the follow-up visits after surgery, eight needed exploration of the biliary, tract, three had acute cholecystitis, one had Mirizzi Syndrome, two needed biliary-enteric bypass and six undergoing other concomitantprocedures. Thus, this study included a total of 126 patients, 64 in group 1 and 62 in group 2. Of these, 23 were male and 113 female. The mean age was 45.60 years, ranging between 19 and 83 years. The operative time ranged between 30 and 210 minutes.The first group had a mean operative time of 94.14 minutes, while the second group was on average 80.90 minutes. There were seven cases of postoperative complications. Five of these complications occurred in group 1, three wound infections, one skin dehiscence and one case of seroma. The two complications in group 2 was related to the presence of seroma (Table 1).

DISCUSSION

Previous studies have shown that the use of tissue adhesives should be limited to lesions not infected or contaminated and adequate hemostasis (Gennari et al, 2004), showing comparable results in these cases or even better than traditional suture techniques. One of the advantages of using cyanoacrylate is to reduce the operative time (Nahas et al, 2004; Gennari et al, 2004; Rimmer et al, 2006; Shamiyeh et al, 2001; Sebesta et al, 2003). According to Bozkurt the use of adhesives would be fifteen times faster than the manufacture of surgical sutures of head and neck.Only Ridgway et al (2007) had more time with the use of surgical tissue adhesives. The present study found similar results to the literature, whereby the closure with cyanoacrylate is averaging nearly 15 minutes faster than with stitches, depending on the surgical procedure. There were no cases of infection of patients underwent surgical closure with cyanoacrylate, while in Group 1 there were three cases in

a total of 64 patients (4.68%). In literature, there is emphasis on the antimicrobial property of cyanoacrylates in vitro and in vivo (Gennari et al, 2004; Singer et al, 2008; Gueiros et al, 2001), especially in the case of ethyl-cyanoacrylate (Superbonder ®), which would effectively act against Sthaphylococci,

Streptococci and Gram-negative bacteria (like E.coli and E. faecalis). Ridgway et al (2007) also agree

with the tendency to reduce surgical site infection with the use of adhesives based on cyanoacrylates.

Most authors do not consider an increase in wound dehiscence as statistically significance (Handschel et al, 2006; Bozkurt et al, 2008; Gennari et al, 2004; Sebesta et al, 2003; Coulthard et al, 2002), unlike Ridgway et al (2007). In this study, there were no cases of wound dehiscence in the patients subjected to the use of cyanoacrylate. In another group there was one case (1.56%). Drainage of serous fluid through the surgical wound was observed in one patient in group 1 and two patients of group 2, this being the single most prevalent complication in the group closed by cyanoacrylate. While aesthetic evaluation is subjective, there seemed to be aesthetic damage to the patients subjected to the use of cyanoacrylate when compared to patients in the group that was used surgical thread. This finding is consistent with that found in the literature (Nahas et al, 2004; Gennari et al, 2004; Shamiyeh et al, 2001; Sebesta et al, 2003; Ridgway et al, 2007; Souza et al, 2007). Regarding costs, the ethyl-cyanoacrylate was purchased in Campo Grande to cost $ 2.00 each bottle that was used in a single patient. The average cost of the nylon 4-0 to the hospital during this period was $ 1.21 per unit. It is believed that the present study demonstrated that the use of ethyl cyanoacrylate (Superbonder ®) is a good option for skin closure in patients undergoing elective cholecystectomy, once found similar or better than those obtained with surgical thread in shorter operative time and with acceptable cost.

CONCLUSION

The use of ethyl cyanoacrylate (Superbonder ®) had lower rates of infection and wound dehiscence when compared with 4-0 nylon, as well as shorter operative time.

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