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Comparison of Needles Sharpness, Suture Strength, Pain Revocation, Postoperative Scar between Polyvinylidene Flouride and Polypropylene Surgical Suture

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ABSTRACT

Background: Surgical Sutures are classified according to the origin of the raw material, the physical format and the ability to absorb or not absorb. Polypropylene Sutures had the flexibility and high tensile strength and showed thrombogenic and thrombogenic reaction low. Overall, the suture material polyvinylidene fluoride and catgut suture material produce tissue reaction which is lighter than the other surgical suture material.

Materials and Method: This study was conducted in Makassar Wahidin Sudirohusodo Hospital in the period from September to December 2017. This study is an observational study, with the approach of case-control study to compare the quality of Suturepolyvinylidene fluoride (cases) with polypropylene Suture (control). Analysis of the data used to determine the ratio of fluoride and polypropylene Suturepolyvinylidene is Independent sample t-test.

Conclusion: conclusions are obtained there is no comparison between the threads of Suture with polypropylene with a fluoridepolyvinylidene the sharpness of the needle, thread strength, pain during removal and scars created.

Keywords: polyvinylidene fluoride, polypropylene, needle sharpness, Suture strength, pain, scars.

INTRODUCTION

Suture implant surgery is most often used by surgeons, but the physical and biological properties are often not fully considered¹. Subject performance of suture also received less attention from the surgical community, because of the failure of performance of suture rarely reported². Ideally, the thread must be easily manipulated, have the elastic and mechanical properties were excellent, showing thrombogenic and low tissue reactivity, and provide biochemical and physical properties over time³

Sutures surgical classified according to the origin of the raw material, the physical format and the ability to absorb or not absorb. The general principles of surgical thread selection depend on the rate of wound healing in tissues and the size of the surgical thread used, the surgical technique and experience of the surgeon. Synthetic sutures tend to be more consistent in appearance, performance, and degradation rather than

biological sutures. Tissue reaction and biocompatibility are critical, and it will be seen that the surgical thread origin tend to be a most biocompatible polymer⁴.

Polypropylene (PP) is introduced as a thread in the late 1950s. This thread had the flexibility and high tensile strength and showed thrombogenic and thrombogenic reaction low. This proved to be resistant to infection but looked vulnerable to trauma iatrogenic. However, in recent years, the safety and efficacy of the use of polypropylene surgical thread in a variety of surgical procedures have been questioned. Degradation and failure phenomena, such as fragmentation and the fracture surface at a location away from the knot, has been observed in vascular surgery and ophthalmologist⁵.

To find a suture materials nonabsorbable equivalent to polypropylene in ease of handling and tensile properties, and has thrombogenic low and the reactivity of the network but increase biostability, some researchers and doctors see the benefits in considering the suitability

of a monofilament made of polyvinylidene fluoride (PVDF)^{6,7}. There is interest in the medical device industry in the search for new alternative biomaterials, and in this context, the use of fluoride poliamididen potential as suture material.

Past studies indicate that surgical thread PVDF has the same strength, elongation higher at rest, an excellent physicochemical characteristics, and durability better pull on surgical thread polypropylene. Also, it has been found that they are less susceptible to iatrogenic traumatic than surgical thread polypropylene⁸.

Currently, the suture material is ideal for all occasions does not exist, nor ever likely to be found⁹. Therefore, the surgeon must try to adjust their needs to the patient's tissues, with a thorough knowledge of the material available to him¹⁰. Because of the importance of research on multiple threads non-absorbable material, then we are interested in comparing the sharpness of a needle, thread strength, pain and scarring of postoperative retraction thread between polyvinylidene fluoride with polypropylene Suture. This is based on the use of sutures very much, the number of cases is abundant, the study can be implemented, and it is essential in the effectiveness and efficiency of Wahidin Sudirohusodo Hospital in Makassar.

MATERIALS AND METHOD

Research Methods

This study was conducted in Makassar Wahidin Sudirohusodo Hospital in the period from September to December 2017. This study is an observational study, with the approach of case-control study to compare the quality of Suturepolyvinylidene fluoride (cases) with polypropylene Suture (control),

Exclusion criteria

Other than the surgical suture thread polyvinylidene fluoride with polypropylene

Sutures that have been infected at the time of surgery.

How it Works

categorized Sharpness sharp needles pricking when the operator perform once on the network, not sharp if done two times or more

Strength endurance categorized Suture thread not to break up the withdrawal process when suturing the surgical wound.

Skar (Scar) considered standard if there are only a scar great Sutures and said if there are injuries in addition to second-hand threads. Observations on the scar made 14 days after surgery.

Pain is felt categorized into two, VAS <5 and VAS>5

DATA ANALYSIS

The data collected in this study are primary data obtained from field observations and patients' medical records at the surgery department Wahidin Sudirohusodo Hospital. Analysis of the data used to determine the ratio of fluoride and polypropylene Suturepolyvinylidene is *Independent sample t-test*.

RESULTS

Individual Characteristics Research Sample

a. Age

Table 1 shows that there are respondents with the largest age category in the age category 40-49 years with a total of 129, or by 32.3%. Then there is the category of age > 70 with an amount of 3 respondents or 0.8. In the case of sample categories, criteria most considerable age is 40-49 years with some 80 people or 40% of the total sample criteria case. While in the control sample criteria, the largest age category was 30-39 years with some 71 people or 35.5% of the total sample of 200 control samples.

b. Gender

Distribution of sample by gender there are 208 respondents with male gender, or by 52% and as much as 192 respondents with female gender or equal to 48% of the total of 400 respondents. In the case of sample categories, respondent highest number found in the male gender with some 109 samples or 49.5% of the total sample of 200 respondents. While in the control sample category most samples contained in the female gender by the number 101 or by 50.5% of the total group of 200 control samples.

Table 1: Characteristics of Sample Research by Age, Sex, and Type of Operations in Wahidin Sudirohusodo hospital September - December 2017

	Group Sample		Total
	Case	Control	
Age			
<20 years	0 (0.0%)	5 (2.5%)	5 (1.3%)
of 20-29 year	0 (0.0%)	43 (21.5%)	43 (10.8%)
30 -39 years of	36 (18%)	71 (35.5%)	107 (26.8%)
40-49	80 (40%)	49 (24.5%)	129 (32.3%)
of 50-59 year	38 (19%)	21 (10.5%)	59 (14.8%)
60-69 years	45 (22.5%)	9 (4.5%)	54
(13.5%)>70 years	1 (0.5%)	2 (1%)	3 (0.8%)
Gender			
male	109 (49.5%)	99 (49.5%)	208 (52.0%)
Female	91 (45.5%)	101 (50.5%)	192 (48.0%)
Type of operation			
Operation of the	179 (89.5%)	178 (89%)	357 (88.9%)
Small Ops	21 (10.5%)	22 (11%)	43 (11.1%)
Total	200	200	400

c. Operation type

Then to the distribution of types of operations are divided into two, namely small and large operations. Small operation in question is operating on a hernia and hemorrhoids, apart from these two diseases are categorized as major surgery. Respondents with large operations category as many as 357 events or by 88.9%. While the data has been received that a small operation by 43 incidences or 11.1% of the total incidence of operating as many as 400

Comparison Test Acumen Surgical Needle Sutures Polyvinylidene Fluoride with Polypropylene

Table II shows that the needles are variable acuity or mean value between threads polyvinylidene fluoride with a control sample of polypropylene at 1:01 and the second standard deviation on the same thread by 0.071. Then on a sample of cases had a mean value of 1.00 and a standard deviation of 0.00. The results of statistical tests using independent sample t-test p values obtained for 0.318. These results showed that there was no significant difference between polyvinylidene fluoride with polypropylene thread to needle sharpness at the time of surgery.

TABLE:2 Comparison Needle with Thread Polyvinylidene Fluoride with Polypropylene

Samples	Sharpness Needles (mean ± std)	Strength of Suture (mean ± std)	pain (mean ± std)	Skar (mean ± std)
Controls	1:01 ± 0.071	1:01 ± 0.100	3.84 ± 1.402	1:11 ± 0.307
case	1:00 ± 0:00	1:00 ± 0:00	3.65 ± 0.965	1:12 ± 0.326
p-value	0.318	0.157	0.115	0.636

Test Comparison of Strength of Suture Surgery Polyvinylidene fluoride with polypropylene

Power of Suture are values or mean between the thread polyvinylidene fluoride with polypropylene in a sample control at 1:01 and standard deviation the second thread is equal to 0.100. Then on a sample of cases had a mean value of 1.00 and a standard deviation of 0:00. The results of statistical tests using independent sample t-test p-value of 0.157 were obtained. These results showed that there was no significant difference between polyvinylidene fluoride with polypropylene Suture to Suture strength.

Comparison Test Suture Surgical Pain While Lifting of Polyvinylidene Fluoride With Polypropylene

In Table II shows that there is a pain when revocation or mean value between threads polyvinylidene fluoride with polypropylene in control samples of 3.84 and standard deviation on both threads is equal to 1.402. Then in case of samples have a mean value of 3.65 and a standard deviation of 0965. The results of statistical tests using independent sample t-test p-value of 0.115 were obtained. These results showed that there was no significant difference between fluoride with polypropylene Suture polyvinylidene to pain inflicted at the time of revocation.

Test Comparison of Post-Surgical Scar Surgery Polyvinylidene Suture Fluoride with polypropylene

Scars are mean value of fluoride polyvinylidene with polypropylene Suture on at 1:11 and the control sample standard deviation on both threads is equal to 0.307. Then on a sample of cases had a mean grade of 1:11 and a standard deviation of 0.326. The results of statistical tests using independent sample t-test p-value of 0.636 were obtained. These results showed that there was no significant difference between fluoride with polypropylene Suture polyvinylidene to pain inflicted at the time of revocation.

DISCUSSION

The sharpness of a surgical needle which assembles depending on the composition of the needle, the needle selection must be by the bending of the needle when clamping biomechanics at the time of surgery¹¹. Subject needle sharpness is closely related to the speed merge in a

truncated network¹². Needle sharpness is also dependent on the type of stitching is done at the close network with acceptable criteria evaluation value network with 98.3%¹³.

Suture strength depends on the material abrasion resistant high strength characteristics better tie down. Thread strength depending on the material that mainly covered by a braided sheath¹⁴. Suture with polypropylene material retains its strength at the time of the action, but fragmentation occurs on a few stitches. In addition to fluoride polyvinylidene with polypropylene are also non-absorbable sutures coated silicone as a comparison for a 20% weight unrelated filament and the inert suture is absorbed by living tissue.

Sewing process when the network brings together 24-26% perceived by the patient at the time of suturing using prolene sutures¹⁵. Materials that are not able to be absorbed by the body did have a high pain, but the material has a low risk of infection¹⁶. Postoperative pain level reported being highly dependent on the quality of sleep that is owned by the patient after the post-surgery¹⁷.

Scars are visible in addition to aesthetic can interfere with performance, there is also a significant correlation between the contribution and the age factor to the occurrence of wound infections. Besides the age factor, there is also a significant correlation to the surgical wounds infection complicating factors of individual diseases and wound care¹⁸.

Overall, the suture material PVDF and catgut suture material produces tissue reaction which is lighter than the other surgical thread material. This study illustrates the benefits of surgical thread monofilament (PVDF)¹⁹. The suture material can be a reasonable candidate for a surgical suturing oral tissue after surgery, especially if it takes longer. Also, microscopic evaluation of surgical thread material can be a useful method to compare the inflammation and formation of fibrous connective.

CONCLUSIONS

Based on research conducted at the Wahidin Sudirohusodo Hospital with a sample size of 400 patients to compare the sharpness of a needle, thread strength, pain inflicted and postoperative scar the conclusion that there is no comparison between the floss between the floss with fluoride polyvinylidene polypropylene with the variables studied

Conflict of Interest: None

Ethical Clearance : Ethical clearance by Faculty of Medicine committee

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