

BUTTONHOLE NEEDLING AS SAFE AS ROPE-LADDER PUNCTURE METHOD

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INTRODUCTION

The rate of localized signs of infection in standard versus buttonhole needling had been reported to be 22.4 versus 50 per 1000 hemodialysis sessions (P=0.003) in 2012. Furthermore, the bacteremia was found to occur only in the Buttonhole group. We considered that at least one of the causes for the higher infection rate in the BH technique could be the insufficient removal of scabs. These are strongly fixed to the entry site and possibly contaminated by bacteria. To remove scabs more sufficiently at the time of buttonhole cannulations, we soaked a 0.4% povidone iodine solution into a gauze and put it on the buttonholes for five minutes to soak scabs. Using this method, in many cases, scabs could be wiped off. We treated the buttonhole entry site with a moist wound healing technique after the removal of dull needles, so that scabs would stick less cohesively and therefore could be removed more thoroughly at the time of the next hemodialysis. This new treatment makes the buttonhole entry site clearer, and disinfection procedure time is extended to more than 5 minutes. In this study, we compared the frequency of local infection and bacteremia with the rope ladder puncture method and buttonhole puncture method.

METHODS

After the hemodialysis session, when the bleeding stopped, we put a small amount of petrolatum album on the buttonhole entry site and covered it with an adhesive plaster to keep the site moist even at home. Then, we instructed patients to wash buttonholes using a commercially available microfiber cloth at home whenever they washed their hands and then to apply the same ointment on the site again to keep it moist. At the time they came to our dialysis facilities, we soaked a 0.4% povidone iodine solution into gauze and put it on the buttonhole for five minutes to soak scabs. Using this method, in many cases, scabs could be wiped off easily. Furthermore, we also checked the entry site using forceps and then rubbed the site more than ten times using a single packaged piece of alcohol cotton. We observed the entry site before making the puncture and checked for signs of infection such as redness, pain and pus formation. Also, we checked for symptoms of bacteremia such as a high fever.

RESULTS



Figure 1. Moist wound healing method prevents scab formation.

RESULTS

From January to December 2014, we observed 160 patients in Yokohama Minami clinic. The puncture method was selected in regards to the state of access vessels. Patients were treated by either the buttonhole or the rope ladder puncture method, and in some cases, a combination of both. As a result, 115 sites were punctured by using the rope-ladder method and 205 sites were punctured by using the buttonhole technique. In the buttonhole puncture site cases, we performed our new treating method, and in the rope ladder method cases, we scrubbed the puncture site more than 10 times with single packed alcohol cotton. Local infection occurred 0.45 times / 1000 puncture opportunities in the buttonhole puncture method, and 0.30 times / 1000 puncture opportunities in the rope ladder method. There was no significant difference between the two groups (p=0.37, Pearson's chi-squared test). Bacteremia did not occur in both groups.

CONCLUSIONS

There were two technical differences between this and previous studies of buttonhole puncture methods. Firstly, the treatment of the buttonhole entry site using the moist wound healing method to prevent the formation and attachment of scabs. Secondly, the soaking of scabs with a disinfecting agent. We had an issue with a patient who suffered from bacteremia 4 years ago, and this painful incident leads us to research this procedure. We will continue to use this method regularly and thoroughly to decrease further infection.

	Design	n	Outcome	RL	BH	P
Shibata(2015)	Retro	160	Local Infection	0.30/1000puncture	0.45/1000puncture	NS
Toma(2003)	Prosp	80	Local Infection	0 events/ 1000 AVF days	0.9 events/1000 AVF days	NR
MacRae (2012)	Rand	140	Local infection	22/1000 HD	50/1000HD	0.003
Chow (2011)	Rand	70	Local infection	1 pts	4 pts	0.11
Struthers 2010)	Rand	56	Local infection	0/28 (0%) pts	1/28 (3.6%) pts	NS
Chan (2014)	Prosp	83	Bacteremia	3	5	0.67
Van Eps (2010)	Prosp	235	Bacteremia		Rate incidence ratio 3.0	0.04
Ludlo (2010)	Prosp	29	infection	2	2	NS
Hashmi(2010)	Prosp	26	infection	24	12	0.5
Van Loon (2010)	Prosp	145	Bacteremia	0	4	0.001
Ward (2010)	Retro	31	Bacteremia	0	3	0.02
Labriola (2011)	Retro	177	Sepsis	0	0.07 / 1000AVFdays	0.23
Nesrallah (2010)	Retro	56	Bacteremia	0.005/1000HD	0.21/1000HD	NR

Table1. The reported ratio of buttonhole infection.

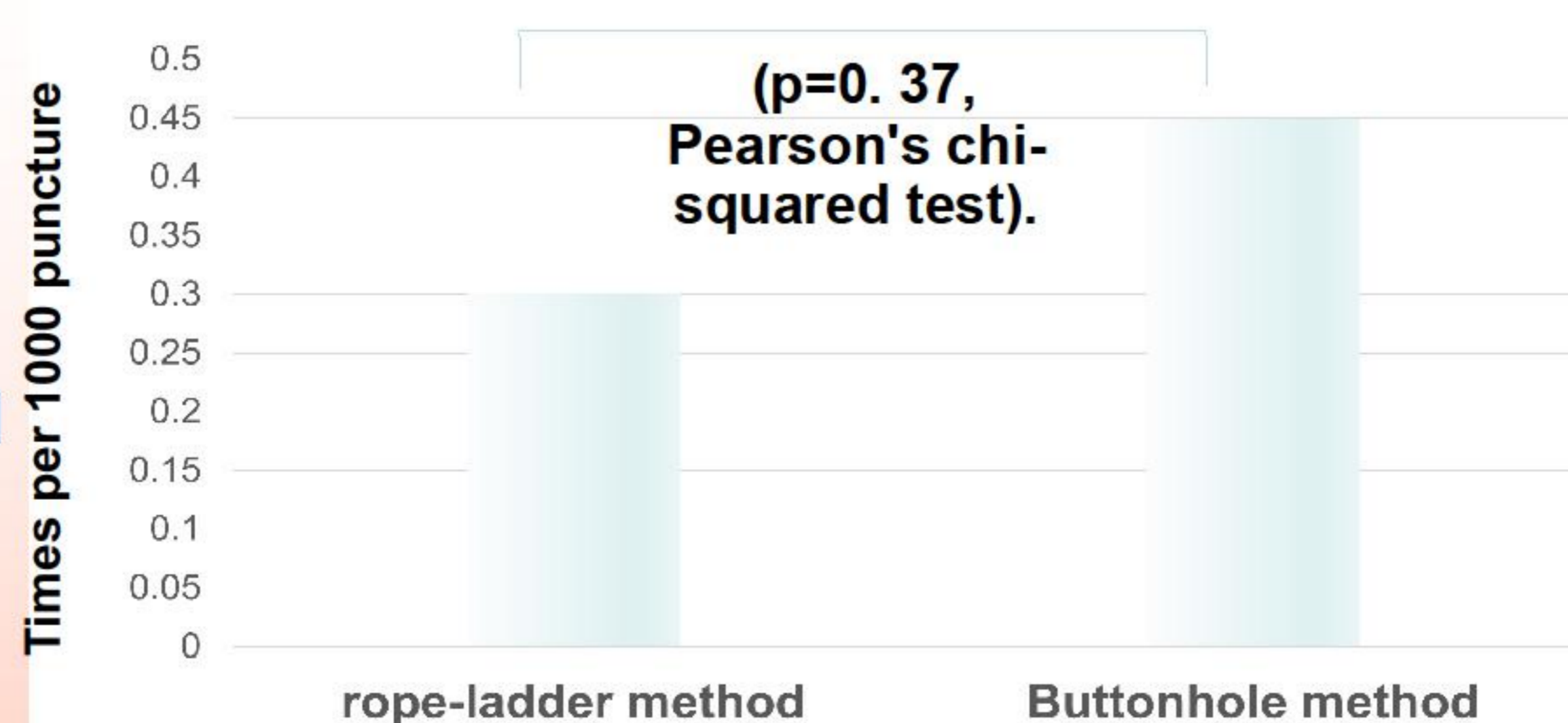


Figure2. Rate of infection comparison of both groups

Number	160
Age (Year)	69.1 ± 12.4
duration of HD ()	114.5 ± 167
rope-ladder method	115site
Buttonhole method	205site
Causative disease of renal failure	
Diabetic nephropathy	45
Chronic glomerulonephritis	53
Nephrosclerosis	19
Polycystic kidney disease	11
Chronic pyelonephritis	3
Rapidly progressive glomerulonephritis	0
SLE nephritis	0
Unknown	6

Table2. Background of the patients

