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The Use of 0.2% Chlorhexidine Gluconate Solution Compared with 10% Povidone Iodine Solution as Anti-septic in Curettage Measure in Case of Early Pregnancy Failure

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Abstract

BACKGROUND: Before aseptic techniques were widely used, the incidence of infections from vaginal surgery was very high at around 30–40%. In addition to antimicrobial prophylaxis, preparation of surgical sites with povidone iodine has been widely recommended. Another surgical antiseptic is chlorhexidine gluconate, which has various clinical uses. Evidence-based research shows that chlorhexidine gluconate is safe and effective as a pre-operative antiseptic. The vagina has a mucosal structure with squamous epithelium without keratinization which has protective and secretion functions. Meanwhile the skin has a squamous epithelium with keratinization. The vagina also has several physiological conditions that have a protective effect on the vagina itself including pH conditions. Furthermore, chlorhexidine gluconate is suspected to have a pH that is almost similar to the physiological pH of the vagina.

AIM: We aimed to study the use of 0.2% chlorhexidine gluconate solution compared with 10% povidone iodine solution as anti-septic in curettage measure in case of early pregnancy failure.

METHODS: This study was a randomized and clinical trial. It compared the use of chlorhexidine gluconate as an antiseptic in the action of curettage in cases of early pregnancy failure with the use of povidone iodine.

RESULTS: The mean comfort score at 24 h and 3 days on chlorhexidine gluconate was lower than povidone iodine but did not show a significant difference ($p > 0.05$), whereas on the 7th day, it had the same comfort score. There was a decrease in 24 h (0.70 vs. 0.2), the accumulation of decreases in 3 days (1.35 vs. 0.75) and 7 days (1.60 vs. 1.30) was higher in chlorhexidine gluconate compared to povidone iodine, but the difference is not statistically significant.

CONCLUSION: Chlorhexidine gluconate provides the same effectiveness compared to povidone iodine in curettage cases in cases of early pregnancy failure. The use of chlorhexidine gluconate can provide better comfort compared to povidone iodine in the aforementioned case, but does not differ statistically.

Introduction

Before aseptic technique was widely used, the incidence of infection from vaginal surgery was very high, around 30–40% [1]. Furthermore, evidence from studies described by the American College of Obstetricians and Gynecologists recommends antimicrobial prophylaxis for all vaginal surgeries [2]. In addition to antimicrobial prophylaxis, surgical site preparation with povidone iodine has been widely recommended [3], [4]. Although the mechanism of how povidone-iodine destroys bacteria is not known with certainty, it has been hypothesized that povidone-iodine reacts with amino acids and fatty acids of bacteria causing damage to cell structures and enzymes [5].

Another surgical antiseptic is chlorhexidine gluconate, which has been available as a topical antiseptic for more than 50 years, having a wide range of clinical uses. Evidence-based studies show that chlorhexidine gluconate is safe and effective as a pre-operative antiseptic solution. Chlorhexidine gluconate is an important component in efforts to reduce the risk of infection related to health facilities. Chlorhexidine gluconate also has broad-spectrum activity including against Gram-positive and Gram-negative non-spore bacteria, fungi, and some lipid envelope viruses, including HIV [6].

The vagina has a mucosal structure with non-keratinized squamous epithelium that has both protective and secretory functions. Very different from skin which has a structure with squamous epithelium with keratinization [7]. This difference of course has an effect on the use of an antiseptic liquid that has long been used, that is 10% of povidone iodine solution, which is mostly used on the skin. The vagina also has several physiological conditions that allow the presence of normal flora which also has a protective effect on the vagina itself, including pH conditions. From this, it can be seen that there should be a difference in the type of antiseptic fluid used

on the skin and on the vagina. On the other hand, chlorhexidine gluconate is suspected to have a pH that is almost similar to the physiological pH of the vagina. Although its effectiveness has been tested in many surgical procedures, its effectiveness compared to 10% of povidone iodine solution in curettage in cases of early pregnancy failure has not been known and studied in Indonesia.

Methods

This study was a randomized and clinical trial study. It compared the use of chlorhexidine gluconate as an antiseptic in the curettage of cases of early pregnancy failure with the use of 10% of povidone iodine solution in the emergency room or operating room of the Obstetrics and Gynecology Departments of Karawang Regional General Hospital/Tangerang Regional General Hospital/Budi Kemuliaan General Hospital/General Hospital Koja area from July 1, 2019, to March 31, 2020. This research proposal has been reported to the RSCM ethics committee and it stated that this study passed the ethical test. Patients included in the study were evaluated for inclusion and exclusion criteria. Inclusion criteria were patients with cases of early pregnancy failure who had agreed to undergo curettage in the ER or Obstetrics and Gynecology operating room at the Karawang Regional General Hospital/Tangerang Regional General Hospital/Budi Kemuliaan General Hospital/Koja Regional General Hospital.

Table 1: Characteristics of subjects

Characteristic table	Use of antiseptic solution				p
	Chlorhexidine gluconate		Povidone iodine		
	n	%	N	%	
Marital status					
Married	20	100.0	20	100.0	-
Not married	0	0.0	0	0.0	
Occupation					
Housewife	12	60.0	16	80.0	0,403#
Government employee	1	5.0	0	0.0	
Private sector employee	0	0.0	1	5.0	
Self-employed	3	15.0	2	10.0	
Others	2	10.0	1	5.0	
	2	10.0	0	0.0	

Fisher's exact test, #) Chi-square.

The target population was all cases of early pregnancy failure that were performed with curettage. The affordable population was all cases of early pregnancy failure which were performed by curettage in the ER or the Obstetrics and Gynecology operating room at the Karawang Regional General Hospital/ Tangerang Regional General Hospital/Budi Kemuliaan General Hospital/Koja Regional General Hospital. Taking research subjects will be done by means of consecutive sampling. The data are collected into one distribution data in the form of a distribution table. The data will be analyzed using Chi-square and entered in a 2 × 2 table according to statistical analysis.

Results

This research was conducted in the emergency room or operating room for Obstetrics and Gynecology at the Karawang Regional General Hospital/Tangerang Regional General Hospital/Budi Kemuliaan General Hospital/Koja Regional General Hospital July 1, 2019–March 31, 2020. There were 40 subjects who met the criteria and were included in the study.

Table 2: Incidence of infection after 24 h

Observation	Use of antiseptic solution				p
	Chlorhexidine gluconate		Povidone iodine		
24 h	n	%	n	%	
Stomachache					
Yes	1	5.0	6	30.0	0.046
No	19	95.0	14	70.0	
Fever and stomachache					
Yes	0	0.0	0	0.0	-
No	20	100.0	20	100.0	
Smelly vaginal discharge					
Yes	0	0.0	1	5.0	0.5
No	20	100.0	19	95.0	
Other symptoms					
Yes	1	5.0	6	30.0	0.046*
No	19	95.0	14	70.0	

The characteristics of the subjects are age, educational status, occupation, and marital status of the research subjects as shown in the following Table 1.

Table 3: Incidence of post-operative infection 3 days

Observation	Use of antiseptic solution				p
3 days	Chlorhexidine gluconate		Povidone iodine		
	n	%	n	%	
Stomach ache					
Yes	1	5.0	3	15.0	0.302
No	19	95.0	17	85.0	
Fever and stomachache					
Yes	0	0.0	0	0.0	-
No	20	100.0	20	100.0	
Smelly vaginal discharge					
Yes	0	0.0	0	0.0	-
No	20	100.0	20	100.0	
Other symptoms					
Yes	1	5.0	3	15.0	0.302
No	19	95.0	17	85.0	

In the characteristic Table 1, all study subjects were women and married in both groups, most of the subjects were IRT either in the chlorhexidine group (60.0%) or the 10% of povidone iodine solution (80.0%). p > 0.05 means that the characteristics based on marriage and occupation between the chlorhexidine gluconate and povidone iodine groups have no significant or homogeneous differences. Post-action is the condition of whether the patient feels abdominal pain, whether the patient feels that there is no fever accompanied by lower abdominal pain and whether the patient feels that there is no smelly vaginal discharge; in 24 h, 3 days, and 7 days as summarized in the Table 1.

Table 4: Incidence of post-operative infection 7 days

Observation	Use of antiseptic solution				p
	Chlorhexidine gluconate		Povidone iodine		
7 days	n	%	n	%	
Stomachache					
Yes	0	0.0	0	0.0	-
No	20	100.0	20	100.0	
Fever and stomachache					
Yes	0	0.0	0	0.0	-
No	20	100.0	20	100.0	
Smelly vaginal discharge					
Yes	0	0.0	0	0.0	-
No	20	100.0	20	100.0	
Other symptoms					
Yes	0	0.0	2	10.0	0.244
No	20	100.0	18	90.0	

There was no difference in the incidence of infection which was characterized by abdominal pain, fever and abdominal pain, and foul-smelling vaginal discharge in cases with chlorhexidine gluconate and 10% of povidone iodine solution (Table 2). There was a significant difference between the incidence of abdominal pain and other symptoms (p = 0.046) (Table 2). However, the patient's complaints of other symptoms may not be related to medical conditions (such as dizziness and nausea) at the 24-h post-operative period.

Table 5: Comfort 24 h after curettage

Antiseptic	24 h convenience				p	RR	CI 95%
	Comfortable		Not comfortable				
	n	%	n	%			
Chlorhexidine gluconate	8	40.0	12	60.0	0.507	1.33	0.56–3.15
Povidone iodine	6	30.0	14	70.0			

There was no difference in the incidence of infection which was characterized by abdominal pain, fever and abdominal pain, and foul-smelling vaginal discharge in cases with chlorhexidine gluconate and povidone iodine at 3-day post-treatment (Table 3).

Table 6: Incidence of annoying itching 24 h after curettage

Observation	Use of antiseptic solution				p
	Chlorhexidine gluconate		Povidone iodine		
24 h	n	%	n	%	
Annoying itching					
Yes	0	0.0	1	5.0	0.5
No	20	100.0	19	95.0	

There was no difference in the incidence of infection which was characterized by abdominal pain, fever and abdominal pain, and foul-smelling vaginal discharge in cases with chlorhexidine gluconate and povidone iodine at 7-day post-treatment (Table 4).

Table 7: Comfort 3 days after curettage

Antiseptic	24 h convenience				p	RR	CI 95%
	Comfortable		Not Comfortable				
	n	%	n	%			
Chlorhexidine gluconate	12	60.0	8	40.0	0.342	1.33	0.73–2.44
Povidone iodine	9	45.0	11	55.0			

The comfort score meant a decrease in the comfort score from 24 h, 3 days, and 7 days after the procedure was compared between chlorhexidine gluconate and 10% of povidone iodine solution.

There was no difference between the incidence of discomfort in the chlorhexidine group and the povidone-iodine group. Although from the number, it appears that the discomfort complaints were more in the povidone-iodine group (Table 5), that is 14 (70%) compared to chlorhexidine gluconate which was 12 (60%). While clinically, patients with chlorhexidine therapy had 1.33 times higher chance of feeling comfortable than povidone iodine. As with the occurrence of annoying itching, in general, there was no difference between chlorhexidine gluconate compared to povidone iodine (Table 6).

Table 8: Incidence of annoying itching 3 days after curettage

Observation	Use of antiseptic solution				p
	Chlorhexidine gluconate		Povidone iodine		
3 days	n	%	n	%	
Annoying itching					
Yes	0	0.0	0	0.0	-
No	20	100.0	20	100.0	

There was no difference between the incidence of discomfort in the chlorhexidine group and the povidone-iodine group. Although from the number, it appears that the discomfort complaints were more in the povidone-iodine group (Table 7), that is 11 (55%) compared to chlorhexidine gluconate which was 8 (40%). While clinically, patients with chlorhexidine gluconate therapy had a 1.33 times higher chance of feeling comfortable than povidone iodine. As with the occurrence of annoying itching, there was no difference between chlorhexidine gluconate compared to povidone iodine (Table 8).

Table 9: Comfort 7 days after curettage

Antiseptic	7-day convenience				p	RR	CI 95%
	Comfortable		Not comfortable				
	n	%	n	%			
Chlorhexidine gluconate	17	85.0	3	15.0	1.000[$]	1.06	0.79–1.42
Povidone iodine	16	80.0	4	20.0			

There was no difference between the incidence of discomfort in the chlorhexidine group and the povidone-iodine group. Although from the number, it appears that the discomfort complaints are more in the povidone-iodine group (Table 9), that is 4 (20%) compared to chlorhexidine gluconate which is 3 (15%). As with the occurrence of annoying itching, in general, there was no difference between chlorhexidine gluconate compared to povidone iodine (Table 10).

Table 10: Incidence of annoying itching 7 days after curettage

Observation	Use of antiseptic solution				p
	Chlorhexidine gluconate		Povidone iodine		
7 days	N	%	n	%	
Annoying itching					-
Yes	0	0.0	0	0.0	
No	20	100.0	20	100.0	

Discussion

From the results obtained, it appears that there is no significant difference between the incidence of infection in the chlorhexidine group compared to the povidone iodine group. This is contrary to many studies which say that the effectiveness of povidone iodine is better than chlorhexidine in reducing the

incidence of infection for several reasons, one of which is the reduced effectiveness of povidone in the acidic environment of the vagina and when mixed with blood due to deactivation of iodophors [8].

Another study also said the same thing that is the incidence of infection in surgical wounds was higher in the povidone-iodine group compared to chlorhexidine [9].

Another study also said that the number of patients with positive bacterial cultures on the skin after antiseptic preparation for surgery was higher in the povidone-iodine group compared to the chlorhexidine group [9].

From the results, it was found that statistically there was no significant difference between comfort after 24 h, 3 days, and 7 days after the procedure in the povidone-iodine group compared to the chlorhexidine-gluconate group, although the number of patients who felt comfortable was higher in the chlorhexidine-gluconate group than in the povidone-iodine group.

The difference in the results obtained may occur because the number of samples used in this study is smaller than the results of some of the studies above.

The difference in the results obtained can also occur due to the level of subjectivity that may exist in this study which has also been minimized by the double-blind method.

Conclusion

The use of chlorhexidine gluconate antiseptic solution provides the same effectiveness as 10% of povidone iodine solution antiseptic solution for curettage in cases of early pregnancy failure. The use of chlorhexidine gluconate antiseptic solution provides the same comfort as povidone-iodine antiseptic solution for curettage in cases of early pregnancy failure.

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