International Journal of ChemTech Research
CODEN (USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555
Vol.11 No.08, pp 247-251, 2018

Association between Intrauterine Device Usage with Vulvovaginal Candidiasis

Flora Marlita Lubis*, Nelva Karmila Jusuf, Imam Budi Putra

Dermatovenereology Department Faculty of Medicine of University of Sumatera Utara Haji Adam Malik Hospital Medan, Indonesia

Abstract : Introduction: Candidiasis is an acute / subacute fungal disease caused by Candida species, especially *Candida albicans*. It may infect various organs including genitourinary mucosal membranes. Vulvovaginal candidiasis is one of the most common female genital tract infections. Clinical symptoms that may be found include vaginal discharge, pruritic vulva, burning sensation and dysuria or dyspareunia. Intrauterine device (IUD) is one of the predisposing factors of vaginal candidiasis. The infection is primarily caused by IUD insertion under unsterile conditions. Therefore, this study aimed to see whether vulvovaginal candidiasis occurrence can be triggered by IUD insertion.
Objective: to analyze the association between IUD insertion and vulvovaginal candidiasis occurrence in Puskesmas Pancurbatu.
Methods: This cross-sectional study was done in Puskesmas Pancurbatu, Deli Serdang Regency in June 2017 with consecutive sampling method. Vaginal discharges were taken as samples from the family planning clinic patients. Microbial examinations using Gram staining were done in Clinical Microbiology Department of Faculty of Medicine of University of Sumatera Utara.
Results: 72 subjects were included within this study. They were divided into IUD group and non-IUD group. The majorities of subjects were in 41-50 years old group (44%) and worked as housewive (61%). Gram staining results showed positive yeast growth on 20 subjects (56%) of the IUD group and 36 subjects (100%) on the non-IUD group.
Conclusion: There was a significant association between IUD usage with vulvovaginal candidiasis ($p<0.05$).
Keywords : vulvovaginal candidiasis, intrauterine device.

Introduction

Candidiasis is an acute / subacute fungal disease caused by Candida species, especially *Candida albicans*. It primarily targets oral, vaginal, skins, nails, bronchi or lung areas and occasionally causes septicemia, endocarditis, and meningitis. Vulvovaginal candidiasis is one of the most common female genital

DOI= http://dx.doi.org/10.20902/IJCTR.2018.110830

tract infection.[1] It is known that at least 75% of female have experienced at least one episode of candida infection with almost 10% experienced more than one episode. This infection is caused by abnormal yeast growth on the mucosal and/or epithelial layers of female genital tract.[1,2] *Candida albicans* is the most common etiology. More than 85% of vulvovaginal candidiasis are caused by *Candida albicans* followed by *Candida glabrata* at 4-5% and may be occasionally caused by *Candida tropicalis* and *Candida parapsilosis.*[2] Diagnosis are usually made upon finding the appropriate clinical symptoms and positive fungal result under KOH test and fungal culture examinations.[1,2,3]

Vulvovaginal candidiasis is the second most common vulvovaginal disease after bacterial vaginosis in the United States with 29.8% positive lab test results. The symptomatic prevalence in Scandinavian countries is found at 13.4%.[3] Vulvovaginal candidiasis incidence has risen during this last decade and many predisposing factors contribute within.[6,7] A study on genital tract infections among commercial sex workers in Medan, Sumatera Utara by Sedaningsih ER, et al in 2005 found 27% vulvovaginal candidiasis prevalence rate among Medanese female sex workers.[9] Presence of predisposing factors may cause pathogenic transformation upon the Candida fungi, thus causing vaginal candidiasis.[2,4,5]

Intrauterine devices were marketed first during early 1970s as an important contraceptive option for 150 million female over the world. It is a safe, reversible, cheap, highly effective, long-run, and non-hormonal contraceptive method that does not hinder sexual activity. With a failure rate less that 1% and 10-years effectiveness, it is considered as one of the most effective contraceptive method.[6,7,8]

IUD is one of the predisposing factors of vaginal candidiasis. White vaginal discharges were commonly found after the initial IUD usage. Vulvovaginal candidiasis can be caused by IUD insertion under unsterile conditions among others. It may precipitate abnormal vaginal microbial growth. A study in Nigeria found 49.7% *Candida albicans* infection rate among IUD users. Another study done in Mataram found 88.24% *Candida albicans* infection rate among IUD users during the first week after the initial insertion and 91.18% during the first month after the initial insertion.[7,8] A study done in Pirngadi Hospital Medan found the vulvovaginal candidiasis infection rate was at 80% among 30 IUD users. 70% infection rate was found among Cu-T 380A IUD users.[10]

IUDs can trigger pathogenic changes upon asymptomatic candida fungi.[7,8,9] Therefore, this study aimed to see whether IUDs can trigger vulvovaginal candidiasis.

Subjects and Methods

This was a cross sectional study. Consecutive sampling method was used and sampling had been done in Puskesmas Pancurbatu, Deliserdang Regency from June 2017 until enough samples were taken. Sample analysis was done in the Clinical Microbiology Department of USU Faculty of Medicine. Intrauterine device (IUD) was identified as the independent variable in this study while vulvovaginal candidiasis was identified as the dependent variable. Study samples included patients with and without IUD usage in Puskesmas Pancurbatu Deli Serdang Regency that fulfills the inclusion criteria. The exclusion criteria were patients who had been administered antibiotics, in their menstrual period, gynecological cancer, and those who didn't want give their consent to the study. History taking was done on the patients. Microscopic examination with 10% KOH and Gram staining preparations were made using the vaginal discharge samples.

Univariate analysis was done to identify the basic characteristics of the subjects. Bivariate analysis was done to identify the association between the IUD with vulvovaginal candidiasis occurrence using Chi square test. The deviation (α) was set at 0,05 with statistical significance set at $p<0,05$. The results were then showed in tables.

Results

This study involved both IUD and non-IUD groups at 36 people each. As seen in table 4.1.1, IUD users were found the most in the 41-50 years old age group (44%) followed by the 31-40 years old age group (40%). The 20-30 years old age group and above 50 years old age group were found to be the least prevalent group at 8%. The 31-40 years old age group and the 41-50 years old age group were found to be the most prevalent age

group within the non-IUD group at 44% and 31% respectively while the above 50 years old group was found to be the least prevalent within the same group at 8%.

Table 1. Subjects characteristics

Characteristics	**Subjects**				**Total**
Age	**IUD users**		**Non-IUD**		
20 – 30	3	8,0%	6	17,0%	9 (12,0%)
31 – 40	14	40,0%	16	44,0%	30 (42,0%)
41 – 50	16	44,0%	11	31,0%	27 (38,0%)
>50	3	8,0%	3	8,0%	6 (8,0%)
Education					
Unschooled	0	,0%	3	8,0%	3 (4,0%)
Primary School	5	14,0%	3	8,0%	9 (13,0%)
Middle School	2	6,0%	6	17,0%	8 (11,0%)
High School	10	28,0%	18	50,0%	28 (40,0%)
University	19	52,0%	6	17,0%	24 (33,0%)
Occupation					
Housewife	22	61,0%	16	44,0%	38 (52,0%)
Office worker	7	20,0%	2	4,0%	9 (12,0%)
Farmer	4	11,0%	9	24,0%	13 (18,0%)
Teacher	3	8,0%	3	8,0%	6 (8,0%)
Entrepreneur	0	,0%	6	20,0%	6 (10,0%)
Total	**36**	**100%**	**36**	**100%**	**72 (100%)**

The most prevalent ethnic group found among the IUD users was the Nias ethnic group (36%) followed by Batak (33%) while the lowest was the Karo ethnic group (4%). In the other hand, the most prevalent ethnic group among the non-IUD users was the Karo ethnic group (42%) followed by Batak (33%) while the lowest was the Melayu ethnic group (8%).

Under education level classification, most of the subjects within the IUD users group were tertiary school graduates (52%) followed by upper secondary school graduates (28%) while lower secondary school graduates were found the least (6%). In the other hand, most of the subjects within the non-IUD users group were upper secondary school graduates (50%) followed by tertiary school graduates and lower secondary school graduates at 17% each while primary school graduates and the unschooled group were found the least at 8% each.

Under occupation classification, most of the subjects within the IUD users group were housewives (61%) followed by the office workers (20%) while teachers were found the least at 8%. Within the non-IUD users group, most of the subjects were housewives (44%) followed by the farmers (24%) while office workers were the least prevalent within the group at 4%.

Table 2. IUD usage duration frequency table

IUD usage	**Frequency**	**Percentage**
<12 months	12	33,0%
1 - 5 years	10	28,0%
6 - 10 years	10	28,0%
>10 years	4	11,0%
Total	36	100%

As seen in table 2, most IUD users were using the IUD with duration <12 months (33%). People who were using the IUD with duration >10 years were found the least at 11%.

Table 3. Association between IUD usage and vulvovaginal candidiasis

Candida species	Subjects				Total	P value*
	IUD users		Non-IUD sers			
Yeast (+)	20	56%	36	100%	56 (78,0%)	
Yeast (-)	16	44%	0	0%	16 (22,0%)	0,001
Total	36	100%	36	100%	72 (100%)	

As seen in table 3, all specimens taken from the non-IUD users yield positive yeast results (100%) while 20 specimens taken from the IUD users yield positive yeast results (56%). Using Chi-square test, these results were found to be statistically significant ($p<0.05$). Out of the 36 specimens taken from the vulvovaginal candidiasis patients using the IUD, 20 specimens were found to be yeast positive (56%) and 16 specimens were found to be yeast negative (44%). Whereas, out of the 36 specimens taken from the vulvovaginal candidiasis patients not using the IUD, all specimens were found to be yeast positive (100%).

Discussion

This study found 16 IUD users subjects (44%) who had vulvovaginal candidiasis were within the 41-50 years old age group. Similar results had been found in a study by Zannah et al (2012) where 50 IUD users subjects (76.92%) who had vulvovaginal candidiasis were within the 25-40 years old age group. A factor that was thought to contribute to the high prevalence of IUD usage found within these age groups include the high risk pregnancy commonly associated to these age groups.

In this study, amongst the IUD users, most people were found to be housewives at 22 people (61%). Similar result were found by Tasik et al (2016) where their study found housewife as the most prevalent occupation within the IUD users group at 6 people (20.7%).[4] When divided by ethnic groups, Nias ethnic group was found to be the most prevalent group at 36%. 52% of the whole subjects were also found to be tertiary school graduates. This suggested that people with higher education tend to have a better understanding upon the importance of using contraceptive devices as means to lower the pregnancy frequency.

This study found that most of the subjects that contracted vulvovaginal candidiasis had used IUD <12 months (12 people, 33%). In the other hand, a case control study by Anindita W (2006) found no statistical significance between IUD usage duration with vulvovaginal candidiasis.[11]

In this study, 20 vaginal discharge specimens taken from IUD users yield positive yeast results under Gram staining (56%). A study by Endang (2003) reported 24 specimens to yield positive yeast results out of 30 specimens taken from IUD users (80%).[12] This was concurrent to a study by Anindita W (2006) where she found that contraceptive devices usage is a prominent risk factor for vulvovaginal candidiasis.[11] *Candida albicans* may grow on vaginal areas under unsanitary and humid conditions. These conditions may cause pathogenic changes to the otherwise normal *Candida albicans*.[7]

In this study, all of vaginal discharge specimens taken from non-IUD users yield positive yeast results under Gram staining (100%). With the Chi-square test, the association between the IUD usage with the vulvovaginal occurrence were found to be statistically significant ($p<0.05$). However, the direction was found to be quite contrary to what had been previously thought. Hygienic vaginal care and frequent IUD checkups were thought to be some of the factors that contributed to this result. It was also thought that health advocacies had been given less to the non IUD groups thus contributed also to the result. A study by Anindita (2003) showed that hormonal contraceptive agent users have 2.39 times more risk to develop vulvovaginal candidiasis compared to mechanical contraceptive agents users.[11] In said study, the control group patients were women of childbearing age who most likely had worn IUDs. Many professionals stated that IUD is a risk factor, but doesn't directly cause vulvovaginal candidiasis. Factors that may contribute to exponential growth of candida include antibiotic usage, diabetes mellitus, compromised immune system, pregnancy, usage of hormonal contraception, contraceptive tools such as vaginal sponges, diaphragms, IUDs, and in some cases, spermicide usage. Women who are sexually active were also found to have higher risk to develop a chronic fungal infection when compared to women who are not sexually active.[7,10] Studies on contraceptive effects as a predisposing factor for vulvovaginal candidiasis had been limited. Several studies cited that oral contraceptive users have higher risk to develop vulvovaginal candidiasis. Another large-scope study done on university students didn't find contraceptive devices as a significant risk factor to develop symptomatic candidiasis.[13]

Long duration of IUD usage might be one of the risk factor to develop yeast in this study. Demirezen (2005) stated that longer duration of IUD usage may contribute to the vulvovaginal candidiasis occurrence. Thus it is important to do routine IUD checkups to prevent the yeast development.[13,14]

Conclusions

It was found that most of the IUD users were tertiary school graduates (52%) within the 41-50 years old group (44%) and worked as housewives (61%). It was also found that most of the non-IUD users were high school graduates (50%) within the 31-40 years old age group (44%) and worked as housewives (44%). Most of the IUD users had worn the IUD less than one year (33%) while only some of them were found to had worn the IUD more than 10 years (11%). The association between the IUD usage with the candidiasis occurrence was found to be statistically significant ($p<0.05$).

References

1. Kundu RV, Garg A. Candidiasis. In : Goldsmith LA, Katz SI, Gilchrest BA, Paller AS, Leffell DJ, Wolff K. (Eds.): *Fitzpatrick's Dermatology In General Medicine*. 8th edition. New York : McGraw-Hill Companies. 2012. p.2298-2307
2. Fornaria G., Vicente V.A., Gomesa R.R., Murob M.D., Pinheiron R.L., Ferrari C., Herkerta P.F., Takimurac M., Sergio de Carvalhoc N., dan Telles F.Q. Susceptibility and molecular characterization of Candida species from patients with vulvovaginitis. Brazilian Journal of Microbiology. 2016. 47, 373-380.
3. Ervianti E., Sawitri, Murtuastutik D., Agusni R.I. Pola Pergeseran Candida sp. Penyebab Kandidiasis Vulvovaginalis dan Kandidiasis Vulvovaginalis Rekuren. Berkala Ilmu Kesehatan Kulit & Kelamin Vol. 23, no. 3. 2011. hal. 189-199.
4. Tasik N.L., Kapantow G.M., dan Kandou R.T. Profil kandidiasis vulvovaginalis di Poliklinik Kulit dan Kelamin RSUP Prof. Dr. R. D. Kandou Manado periode Januari – Desember 2013. Jurnal e-Clinic (eCl) Volume 4, nomor 1. 2016. 208.
5. Dirjen PP&PL Kementerian Kesehatan Republik Indonesia Laporan Hasil Penelitian Prevalensi Infeksi Saluran Reproduksi pada Wanita Penjaja Seks di Medan, Tanjung Pinang, Palembang, Jakarta Barat, Bandung, Semarang, Banyuwangi, Surabaya, Bitung, Jayapura, Indonesia. 2005. hal. 25.
6. Gandhi T.N., Patel M.G., dan Jain M.R. Prospective Study of Vaginal Discharge and Prevalence of Vulvovaginal Candidiasis in a Tertiaty Care Hospital. IJCRR. Vol. 7. 2015. 34-38.
7. Teeraganok T., Manonai J., dan Chongtrakol P. Vaginal Health in Cooper Intrauterin Device Users and Non-users. Thai Journal of Obstetrics and Gynaecology Vol. 20. 2012. 48-53.
8. Winner B., Peipert J.F., Zhao Q., Buckel C., Madden T., Allsworth J.E., dan Secura G.M. Effectiveness of Long-Acting Reversible. The New England Journal of Medicine. 2012. 366.
9. Depkes Provinsi Sumatera Utara (2012) Profil Kesehatan Provinsi Sumatera Utara Tahun 2012, hal. 55. Diunduh dari http://www.depkes.go.id/resources/download/profil/PROFIL_KES_PROVINSI_2012/02_Profil_Kes_Prov.SumateraUtara_2012.pdf [diakses tanggal 15 April 2016].
10. Wathaniah S., Sundayani L., Hanafi F., Diarti M.W., dan Jiwintarum Y. Faktor Mikroba Penyebab Infeksi Saluran Reproduksi pada Akseptor Intrauterin Device (IUD) di Kota Mataram. Buletin Penelitian Sistem Kesehatan Vol. 16. 2013. 83–87.
11. Anindita W. Faktor resiko kejadian kandidiasis vaginalis pada akseptor KB. The Indonesian Jurnal of Public Health, vol 3, no 1, Juli 2006: 24-28
12. Darmani E.H. Hubungan Antara Pemakaian AKDR dengan Kandidiasis Vagina di RSUP Dr. Pirngadi Medan. Medan. Karya Tulis. 2003.
13. Daili S.F. Gonore, dalam Ilmu Penyakit Kulit dan Kelamin (editor Djuanda A., Hamzah M., dan Aisah S.) edisi ke 5. 2007. hal. 369-380. Fakultas Kedokteran Universitas Indonesia, Jakarta.
14. Demirezen. The association of Candida infection with intrauterine contraceptive device. Centr. Eur J Public Health, 2005, Mar; 13(1): 32-4.

*****