

Culture- and PCR-based detection of BV associated bacteria in the biofilm of removed IUDs

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Congress of European Society of Contraception, Budapest 9-12 May 2018

Introduction

- # Intrauterine devices (IUDs) are highly effective, long-term methods of contraception.
- # Pelvic inflammatory disease (PID), damage of the reproductive tract, tubal infertility, ectopic pregnancy and chronic pelvic pain.
- # *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in PID was shown not to be higher among women with or without the use of IUD.
- # BV-associated bacteria: *Gardnerella vaginalis*, *Atopobium vaginae*, *Mobiluncus spp.*, *Mycoplasma spp.*, *Ureaplasma urealyticum*
- # IUD use and BV acquisition: not clarified
- # The long-term use of IUDs may lead to biofilm formation on their surface.
- # The aim of this study was to perform the culture- and PCR-based detection of bacteria/fungi from the biofilm of the removed IUDs with different time periods in place.

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Patients and Methods

- # Department of Obstetrics and Gynaecology, University of Szeged
 - January 2014 – December 2016
 - 100 women
 - recording the symptoms and past medical history
 - physical examination and pelvic ultrasound
 - written consent
 - IUDs were removed carefully to prevent contamination
- # Institute of Clinical Microbiology
 - Conventional culture methods: isolation of facultative anaerobic bacteria and fungi (selective and non-selective media)
 - Molecular diagnostic methods: real-time PCR, primers: PC04, GH20
- # Statistical evaluation: chi-squared, Sigmaplot 12.0 program

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Clinical symptoms of the patients at the time of removal of the IUD

Clinical symptoms	Number of patients (%)		
	IUD < 5 years n=32	IUD 5 - 10 years n=36	IUD ≥ 10 years n=32
Mean age (range) of the patients	39.6 (25-51)	43.5 (30-56)	51.8 (33-73)
No symptoms of infection at the removal of IUD	14 (43.8)	17 (47.2)	12 (37.5)
Removal of IUD due to the time in place	8	11	10
Planned pregnancy	3	2	1
Pregnancy beside IUD use	1	0	1
Irregular bleeding	9	7	8
Menopausal / climacteric condition	2	5	5
Leiomyoma	1	3	3
Any symptoms of infection at the removal of the IUD	18 (56.3)	19 (52.8)	20 (62.5)
Fever >38 °C	5	7	4
Irregular bleeding	7	9	6
Acute vaginal / cervical inflammation	7	8	15
Sever lower abdominal pain	5	15	9
Postmenopausal condition of uterus and cervix	0	0	2

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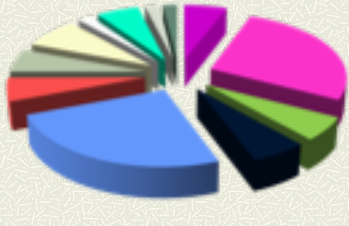
Culture results

Culture results	Number of patients (%)		
	IUD < 5 years n=32	IUD 5 - 10 years n=36	IUD ≥ 10 years n=32
Culture negative	11 (34.4)	16 (44.4)	11 (34.4)
Culture positive	21 (65.6)	20 (55.6)	21 (65.6)
with 2 aerobic isolates	21 (65.6)	12 (33.3)	18 (56.3)
with ≥ 3 anaerobic isolates	8 (25)	11 (30.5)	9 (28.1)
<i>S. agalactiae</i>	7	4	3
<i>M. hominis</i>	0	0	0
<i>U. urealyticum</i>	0	4	2
<i>N. gonorrhoeae</i>	0	0	0
<i>Candida albicans</i>	1	1	0

BV associated bacteria in 28% ESC 10.05.2018, Budapest

Species detected by PCR

qPCR results
BV-associated bacteria in 76% of IUDs



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Comparison of the results of microbiological culture and molecular assays

Detection method	qPCR		PCR		PCR		PCR		qPCR		qPCR	
Species	Atopobium vaginae		Gardnerella vaginalis		Mobiluncus sp.		Ureaplasma urealyticum		Chlamydia trachomatis		Neisseria gonorrhoeae	
	+	-	+	-	+	-	+	-	+	-	+	-
Culture	2	0	1	0	4	0	6	0	0	0	0	0
	37	68	62	38	23	77	16	84	1	99	0	0

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Conclusion

- ✦ In low risk population IUD usage, may not increase the possibility of PID caused by STI pathogens.
- ✦ The frequent isolation of *S. agalactiae* from the biofilm of all three groups of IUDs in our study draw the attention that *S. agalactiae* can be a frequent colonizer of the vagina of IUD users.
- ✦ BV associated anaerobic bacteria were detected in a much higher number in the biofilm of the removed IUDs by PCR-based method compared using culture method (76 versus 28 samples).

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