Endometrial Culture Techniques in Patients with Postpartum Endomyometritist

POSTPARTUM ENDOMYOMETRİTÜ HASTALARDA ENDOMETRIAL KÜLTÜR TEKNİKLERİ

Dr.Ayşe GÜRBÜZ*, Doç.Dr.Umur KUYUMCUOĞLU*, Dr.Vedat DAY1CIOĞLU*, Doç.Dr.Orhsn ÜNAL

* Ministry of Health, Zeynep Kamil Maternity Hospital, Istanbul, TURKEY,
** Ministry of Health, Kartpi State Hospital, Istanbul, TURKEY

SUMMARY

This study was devised to test the effectiveness of transcervical endometrial culture techniques in eliminating cervico vaginal contamination. The culture specimens were obtained from 44 febrile patients with postpartum endomyometritis and 22 afebrile puérperas selected as a control group. Endometrial specimens were obtained with transcervical protective tecniques: Triple lumen aspiration (TLA), double lumen aspiration (DLA) and single lumen aspiration (SLA) methods, and compaired with each other and cervical culture results. Among theree methods evaluated, while SLA method was insufficient TLA and DLA were rather satisfactory procedures in reducing bacteriel contamination by cervicovaginal flora. Although TLA method seems more effective in reducing contamination, there was no significant difference in isolation rate of microorganisms between two methods.

Key Words: **Postpartum endomyometritis, Protective transcervical endometrial culture tecniques**

Anatolian J Gynecol Obst 1993, 3:275-279

ÖZET

Bu çalışmamız korumalı transservikal endometrial kültür tekniklerinin servikovajinal kontaminasyonu azaltmadaki etkinliğini belirlemek amacıyla planlandı. Kültür spesimenleri postpartum endometrit tanısı konulmuş 44 febril hastadan ve kontrol grubu olarak belirlenen 22 afebril puerperadan elde edildi. Endometrial spesimenler SLA (Tek lümenli örnekleme), DLA (Çift lümenli örnekleme), TLA (Üç lümenli örnekleme) teknikleri olarak adlandırılan korumalı transservikal endometrial kültür yöntemleri ile alındı. SLA yöntemi kontaminasyonu azaltmakta çok yetersiz iken DLA ve TLA teknikleri servikovajinal kontaminasyonu tam olarak ortadan kaldırmamakta ancak önemli ölçüde azaltmakta idi. TLA tekniği kontaminasyonu azaltma açısından daha etkili gözükmesine rağmen DLA ve TLA teknikleri arasında mikroorganizma izolasyon oranı açısından istatiksel olarak anlamlı fark yoktu (p>%5).

Anahtar Kelimeler: Postaptum endomyometritis, Korumalı transservikal endometrial kültür teknikleri

T Klin Jinekol Obst 1993, 3:275-279

Puerperal infection is one of the most common problems encountered by the obstetricians (1). The incidence is reported to be 4% in vaginal deliveries, 15% in cesarean section (2,3).

When planning the therapy of endomyometritis, it is helpful! to know which pathogenic microorganisms are the cause of infection (1). Many attempts have been made to determine the bacteriology of infected and non-infected uterus (4,5,6,7). And it is still unclear, as there is no available non-invasive culture method to obtain uncontaminated specimens from the endometrium. So this fact causes empiric use of antibiotics in nearly all of the cases. Hence to reduce or eradicate contamination and so determine the bacteriology of postpartum endomyometritis (PPE) and to treat properly, endometrial culture tecniques have been developed. Transfundal aspiration tecniques, triple lumen aspiration, single lumen aspiration and double lumen brush biobsy are only some of these tecniques (8,9,10).

Eschenbach and associates described TLA method for obtaining endometrial cultures. They reported a definite decrease in contamination of specimens with cervicovaginal microorganisms (9). The purpose of our study was to compare this TLA method with two other simpler methods planned by us.

Geliş Tarihi: 02.07.1992 **Kabul Tarihi:** 18.10.1993

Yazışma Adresi: Dr.Ayşe GÜRBÜZ
Kuyubaşı Sigorta Evleri
C/4, D:6
Kadıköy-İSTANBUL, TURKEY

t This study was presented at XIII. World Congress of Obstetrics & Gynecology (FIGO), September, Singapore

MATERIALS AND METHODS

This study was conducted from first of January to 27th of June 1990 at Zeynep Kamil Maternity Hospital istanbul, Turkey. The study group were composed of 44 clinically diagnosed postpartum endomyometritis and 22 normal puérperas as the control group. Puérperas were included in the study group if they had temperature elevation of 38 °C for four consecutive hours after 24 hours postpartum, or over 38.6 °C within 24 hours of delivery according to the criteria of Filker and Monif (11). They had to have lower abdominal pain, uterin and adnexial tenderness or foul smelling lochia. Physical examination was done to exclude other source of infection. The afebrile puérperas composing the control group had no signs of clinical infection. They were afebrile between delivery and culture and remained afebrile throughout the hospitalisation period. None of the febrile or afebrile puérperas had received prophylactic or other antibiotics in two weeks period before cultures were obtanied. Urine cultures were obtanied in order to exclude urinary system infection.

All of the culture specimens were taken by one of us (A.G.). Four culture specimens were obtained from each women in the study and the control groups in the following sequence; First cervical cultures than endometrial specimens by SLA, DLA, TLA methods were obtained. Cervical and transcervical endometrial cultures were obtained from the study and the control groups in the same manner. For TLA and DLA methods the devices developed by Eshenbach et al were used (9).

For cervical culture the cervix was Identified by placing a sterile speculum into the vagina. The cervix was wiped free of cervical mucus and deep endocervtcal material was obtained and inoculated into proper mediums for isolation of gram positive, gram negative microorganisms, M. Hominis, U. Urealyticum and C. Trachomatis.

After cervical culture, endocervix was cleaned with povidine iodine swabs. Endometrial cultures were obtained transcervically first by SLA technique. In SLA method endometrial specimens were aspirated through Novak curette the thomb plate of which was removed.

In DLA technique a 18 cm long, 7 mm diameter steel tube was inserted through the cervix midway to the fundus and the Novak curette was inserted through the steel tube to the uterina fundus and the endometrial specimens were aspirated with a 20 ml syringe, then inoculated into proper mediums for isolating microorganisms. In TLA method additional a 15 mm diameter, 14 cm long outer sleeve was placed through the cervix, then the steel tube and Novak curette were inserted through the cervix in sequence, and endometrial materials was aspirated in the same manner above (Figure 1).

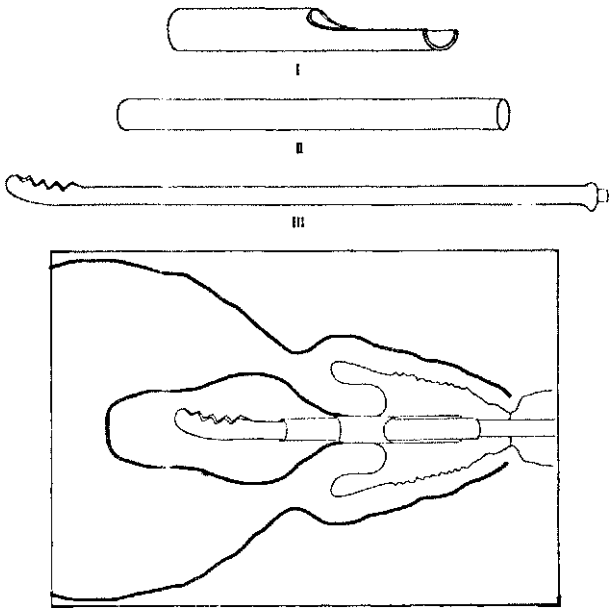

Figure 11: 15 mm diameter 14 cm long outer sleeve, **II:** 7 mm diameter **18** cm long sleeve, **III:** Novak curette

Endometrial and cervical specimens were inoculated into selective liquid media and then into blood agar for isolation of aerobe bacteria and to chocolate blood agar for' Neisseria Gonorrhoeae. Spesimens were inoculated into peptone enriched broth for transport and then inoculated to blood agar and Incubated In a contlnous atmosphere Gas Pak Jar for *48* hours. If no bacterial growth was detected, specimens were incubated for an additional five days. For isolation of chlamydia, specimens were inoculated Into chlamydia transport tubes Chlamydiazym (Abbott) and stored in 4 °C and evaluted by ELISA test. For isolation of genital myocoplasmas, specimens were inoculated into mediums enriched with eritromycin and arginine for isolation of M. Hominis, or with urea and lincomycin for isolation of U. Urealyticum.

In statistical analysis proportional data were compared by chl-square or Fisher's exact test where appropriate, comparison of means were made by student-t test.

RESULTS

The average age of the puérperas with clinical diagnosis of postpartum endomyometritis was 27+2.8, of the control group was 26.5±5.7. The difference between two groups was not significant. Thirtyeight patients were delivered by cesarean section and 6 patients were delivered vaginally in the study group. Sixteen puérperas were delivered vaginally and 6 puérperas were delivered by cesarean section in the control group.

The final diagnosis of endometritis was made on the basis of at least one microorganism Isolated from the endometrial aspirate. Bactériologie evidence of en-

Table 1. Mean number of microorganisms isolated each method in the study and the control groups

	Cervical culture	Endometrial culture SLA	DLA	TLA
Study Group	2.40±0.70	2.0±0.60	1.7±0.5	1.4±0,5
Control Group	1.54+0.83	1.1 ±0.75	0.5±0.6	0.4+0.5
	NS*	S "	S	S

Stunent-t test was used in statistical analysis
•Nonsignificant "Significant

dometritis was present in 44 patients who were cinically diagnosed as PPE. By all culture methods we have used, at least one microorganism was isolated. Table I shows the mean number of different kinds of bacteria isolated by each culture technique in the study and the control groups. Culture from the cervix contains the highest number of microorganism species (2.4 in the study and 1.4 in the control group). Also the results of the comparison of the mean number of microorganisms isolated by the same kind of techniques between the study and the control groups are shown in the table 1.

	Study Group	Control Group
Cervical culture x SLA method (EC)	NS	NS
Cervical culture x DLA method (EC)	S	S
Cervical culture x TLA method (EC)	S	S
SLA method (EC) x DLA method (EC)	NS	NS
SLA method (EC) x TLA method (EC)	S	S
DLA method (EC) x TLA method (EC)	NS	NS

* Student-t test was used in statistical analysis

EC: Endometrial culture

S: Significant (p<0.05)

NS: Non-significant (p>0.05)

In order to determine if there is statistically important difference in isolation rates of microorganisms between cultures of the study and the control groups are compared and the difference was found to be non-signnificant (p-0.1) (Table 2). This data suggested that cervical colonisation shows no important difference between the patients with postpartum endomyometritis and normal puérperas.

The same comparison was performed between the study and the control groups for endometrial cultures taken by SLA (100% positive versus 81.8% positive), DLA (100% positive versus 40.9% positive) and TLA (100% positive versus 36% positive) methods and the diferences were found to be statistically significant (Table 3,4,5).

Table 2. The isolation rate of microorganisms isolated in cervical culture

	Culture Positive	Culture Negative
Study Group	44(100%)	0 (0%)
Control Group	20 (90.9%)	2(9.1%)

Statistical analysis was performed by Fischer's exact test
p-0.1 (nonsignificant)

Table 3. The isolation rate of microorganisms recovered in endometrial cultures by SLA method

	Culture Positive	Culture Negative
Study Group	44(100%)	0(0%)
Control Group	18 (81.8%)	4 (18.2%)

Statistical analysis was performed by Fischer's exact test
p-0.01 (significant)

Table 4. The isolation rate of microorganisms recovered in endometrial cultures by DLA method

	Culture Positive	Culture Negative
Study Group	44(100%)	0 (0%)
Control Group	9(40.9%)	13(59,1%)

Statistical analysis was performed by Fischer's exact test
p-0.00014 (significant)

Table 5. The isolation rate of microorganisms recovered in endometrial cultures by TLA method

	Culture Positive	Culture Negative
Study Group	44 (100%)	0 (0%)
Control Group	8 (36%)	14 (64%)

Statistical analysis was performed by Fischer's exact test
p-0.0009 (significant)

DISCUSSION

Healthy endometrium is generally sterile according to the microbiologic studies of cultures collected by transfunda! aspiration (8,9). However results of this method are somewhat variable depending on the population surveyed microbiolgic studies employed.

Endometrial cultures are most easily obtained in puérperas delivered vaginally by transcervical approach. However it has been recognized for many years that endometrial cultures obtained franscervically may be contaminated by organisms normally present in vagina and cervix (4). So the exact microbiology of endometrium is still somewhat obscure.

To eliminate or minimize the contamination of endometrial specimens and therefore determine the real pathogen microorganisms at the site of infection, many culturing devices were developed.

In 1949 Schaub and Gilbeau reported using of wire culture loop but provided no direct evidence of effectivitiy in reducing contamination (12). In 1964 Bollinger described a double lumen stainless tube through which an aspirating cannula was passed. He reported that the double lumen device shows an improvement in culturing techniques but didn't completely eliminate contamination of culture specimens (13). Duff and coworkers have compared results of qualitative and quantative cultures obtained by three different transcervical endometrial culture methods (Double lumen brush biopsy, double lumen lavage, single lumen aspiration of lower uterine segment) with the results of transfundal aspirate cultures in uninfected puérperas were sterile. Microorganisms were isolated in all of the cultures obtained by single lumen aspiration method. The number of organisms isolated in cultures by single lumen aspiration were higher than the number of organisms isolated by the other methods. The lowest number of organisms were determined in transfunda! approach. At least in theory, transfundal aspirate shouldn't contaminated by cervical organisms and therefore should provide the most pericise result for microorganisms actually present in the endometrial cavity. 61 % of the transfundal aspirates in the study were sterile (1**).** Ledger and coworkers obtained transcervical and transabdominal endometrial cultures in 25 women with dinical diagnosis of postpartum endometritis. The isolation rate of aerobic microorganisms in cultures obtained by transabdominal approach was 15.8% and 96% by transcervical approach. The anaerobes were recovered in 26.3% of transabdominal endometrial aspirations and 88% of the transcervical endometrial cultures. This study implicates that clinical diagnosis of postpartum endometritis may not accurately established as in only 36% of the patients cultures obtained via transabdominal route were positive and in 100% of the patients cultures obtained via transcervical route were positive. This study is contradictory with some of our findings. In our study all of the cultures in patients with PPE were positive by all transcervical culture techniques we employed and in the control group these rates were 82% by SLA method, 40.9% by DLA method and 36% by TLA method. These results were maybe because in Ledgers' and coworkers study urinary tract or the other problems which cause fever were not excluded accurately and misinterpreted as endometritis or the endometrial specimens couldn't be obtained properly by Ledgers and coworkers via transabdominal approach (8).

Spore and coworkers used transfundal aspiration for endometrial cultures and 100% of the cultures were sterile (6). Eschenbach and cowo kers also used transfundal aspiration technique in 14 afebrile puérperas; only in two endometrial specimens, microorganisms were isolated. So these findings suggested that endometrium became sterile in a short period after the delivery. In the same study, microorganisms were isolated in 6 of the 14 patients by TLA technique (9). In our study, microorganisms were isolated by TLA technique in 8 of the 22 afebrile puérperas. So Eschenbach and coworkers' and our study suggest that cervicovaginal contamination occured also in triple and double lumen aspiration methods. The results of endometrial cultures of afebrile puérperas in our study and three other studies suggest that cervical contamination is present in all transcervical methods developed up to that time (1.9.12,13,14.15). In our study, cervical cul tures were positive 90.9% of afebrile puérperas and endometrial culture results obtained by SLA method were very similar to that ratio (81.8%). And the difference between isolation rate of organisms cervical culture and SLA method wasn't statistically significant. This shows that the cultures obtained by SLA technique are exposed highly to cervicovaginal contamination and contamination level seems intolerable. Our study was concordant with the study of Gibbs and associates who used single lumen catheter to get endometrial cultures from afebrile control group and found no differences in the endometrial flora of infected and non-infected puérperas. Bollinger and associates used a teflon sheat containing teflon plug in the distal end, and got endometrial specimens by an inner cannula in 200 afebrile puérperas with no signs of puerperal infection, 60% of the cultures were positive (13). This data also suggest that single lumen methods shows no efficiancy in reducing cervicovaginal contamination of endometrial specimens.

In 40.9% of endometrial specimens taken by DLA method from afebrile puérperas at least one microorganism was isolated. This ratio was 36% for the specimens taken by TLA method from the same puérperas. The difference between DLA and TLA methods in isolation rate of microorganisms in the study and the control group was not significant. So these data suggest DLA and TLA are nearly equally effective in redu-

cing contamination. An other method to determine the effectiveness of protective endometrial culture techniques is to compare the patients clinically diagnosed as PPE and normal afebrile puérperas. In this study the mean number of microorganisms isolated per patients in cervical culture of the study group was 2.4 whereas 1.54 in cervical culture of the control group. And the difference was not statistically significant (Table 1). So this also shows that there is not important difference in cervical colonization of puérperas with or without PPE. But the differences between the means of study and control groups in endometrial cultures obtained by DLA or TLA tecniques are statistically significant ($p<0.05$; Table 1). So this data also suggest that endometrial cultures obtained by protective techniques are necessary for establishing the diagnosis of endometritis otherwise. It is not possible by routine culture method because of the high level of contamination.

Among the techniques employed by us and other authors, transfundal aspiration seems to be most effective method in reducing cervicovaginal contamination. But its disadvantage is its being an invasive method so it doesn't seem possible to carry out this method as a routine procedure (1,6,9).

CONCLUSION

The traditional unprotective endometrial culture devices (cotton, swabs etc.) are insuficient in establishing the diagnosis of PPE because of the high rate of cervicovaginal contamination.

For the practicing clinician both DLA and TLA techniques are reasonable for obtaining endometrial specimens for culture. Both techniques are effective while SLA is ineffective in reduang but not eliminating the contamination of endometrial specimens by organisms for the genital tract.

These culture techniques are valuable in defining the exact bacteriology of postpartum endometritis and alternating the therapy in resistant cases according to the culture results obtained by these techniques.

These sampling devices we have used are simple, safer and cheaper methods.

REFERENCES

1. Duff P. Gibbs RS, Blanco JD. St. Endometrial culture techniques in puerperal patients. Obstet and Gynecol 1983; 161-217.
2. Sweet RL, Ledger WJ. Puerperal infectious morbidity - A two year rewiev. Am J Obstet Gynecol 1973; 117-1093.
3. Gibbs RS, Rodgers PJ, Castenade YS, Ramzy I. Endometritis following vaginal delivery. Am J Obstet Gynecol 1980; 156:555-8
4. Hite KE; Heseltine HC, Goldstein L. A study of the bacterial flora of the normal and pathologic vagina and uterus. Am J Obstet Gynecol 1947; 53:233-40.
5. Wallace RJ, Alport S, Browne K, Lin JSL, McCormack WM. Isolation of Mycoplasma Hominis from blood cultures in patients with postpartum fever. Obstet and Gynecol 1978; 51:181-5.
6 Spore WW, Moskal PA, Nakamuora RM, Michell DR. Bacteriology of postpartum oviducts and endometrium. Am J Obstet Gynecol 1970; 107:572-7.
7. Gillstrap LC, Cunnigham FG. The bacterial pathogenesis of infection following cesarean section. Obstet and Gynecol 1979; 53:545-9.
8. Ledger WJ, Gee CL, Pollin PA, Lewis WP, Sutter VL, Finegold SM. A new approach to patients with suspected anaerobic postpartum pelvic infections; Transabdominal uterine aspiration for culture and metronidazole for treatment. Am J Obstet Gynecol 1976; 126:1-5.
9. Eshenbach DA, Rosene K, Tompinks LS; Watkins H, Giaventt MG. Endometrial cultures obtained by triple lumen method from febrile and afebrile postpartum women. J Infec Dis 153:1038-45.
10. Gibbs RS, O'Dell TN, MacGregor RR, Shwarz RH, Morton H. Puerperal endometritis: a prospective microbiological study. Am J Obstet Gynecol 1975; 121:919-25.
11. Filker R, Monif GRG. The significance of temperature during the first 24 hours postpartum. Obstet and Gynecol 1979; 53:358-61.
12. Gilbeau JA, Schaub IG. Uterine culture technique. Am J Obstet Gynecol 1949; 58:407-10.
13. Bollinger CO Bacterial flora of nonpregnant uterus; a new culture technique. Obstet and Gynecol 1964; 25:251.
14. Knüppel RA, Scerbo JC, Dzink J, Mitchelli, Cetrulo CL, Barleft J. Quantitative transcervical uterine cultures with a new device. Obstet and Gynecol 1981; 57:243-9.
15. Pezzio MT, Hesser JW, Morgan T, Valter PJ, Thrupp LD. Improved laboratory efficiency and diagnostic accurancy with new double lumen protected swab for endometrial specimens. J Clin Microbiol 1979; 9:56-9.