Aerob bacterial and fungal throat flora of the patients with leukemia and lymphoma

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Aerob bacterial and fungal throat flora were examined in 55 patients with leukemia and lymphoma, and 30 healthy controls. The non-indigenous microorganisms isolated from the throat cultures were determined according to types and distribution of disease groups. Also the effects of role of age, performed chemotherapy, admission period in the hospital, neutropenia, usage of antibiotic and antifungal medicine on the throat flora were investigated. Antibiotic sensitivity tests were applied to the isolated non-indigenous bacteria.

The most of the isolated bacteria were p. *hemolitic streptococci, coagulase positive staphylococci, and pseudomonas aeruginosa and klebsiellae. In all patients, expect one in whom both Candida and pénicillium were cultured, growing fungi were Candida and pénicillium. In these patients, normal throat flora were cultured frequently in Hodgkin's lymphoma group 38.5%. Non-indigenous bacteria were most frequently cultured from Non-Hodgkin lymphoma (69.2 %) and acute lymphocytic leukemia (55.6 %) patients. Fungi were most frequently cultured from patients with chronic myelocytic leukemia (100 %) and acute lymphocytic leukemia (66.7 %). Non-indigenous bacteria were mostly isolated from infants or elderly. It is observed that, performed chemotherapy and longer-stay in the hospital, production of neutropenia were increased the growing frequency of non-indigeous microorganisms ($p<0.05$). Also the usage of antifungal therapy decreased the rate of pathogenic bacterial colonisation ($p<0.05$) but increased the rate of fungus colonisation ($p<0.05$). Also the prophylactic usage of antibacterial therapy decreased the rate of fungus colonisation ($p<0.05$). The non-indigenous bacteria isaloted in our study were mostly sensitive to ceftazidime, ciprofloxacin, ofloxacin and cefotaxime. [Turk J Med Res 1994; 12 (2): 73-77]*

Key Words: Leukemia, Lymphoma, Throat flora

The recent developments in the early diagnosis, treatment and prophylaxis of infections in patients with malignant hematological diseases led a better prognosis in this group of diseases. However infections are still one of the important factors which affects morbidity and mortality of the patients (2). According to the statistical reports infections are the most frequent cause of fatal outcome (%50-75) of malignant hematological diseases (1-3). Mouth is a target for infections, where many different types of microorganisms can inhabit. This phenomen gains importance especially for cancer patients.

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The disturbed cellular and humoral immunity, neutropenia, functional disorders of leukocytes, chemotherapy, radiotherapy, splenectomy, acidosis, coma, hypotension, the usage of antibiotics for a long time and hospitalisation are some of the predisposing factors for introducing infections to the cancer patients (1-6).

This study aims to determine the aerob and fungal throat flora of the patients with leukemia and lymphoma, to isolate non-indigenous microorganisms from the cultures, and to determine their antimicrobial sensitivities.

MATERIALS AND METHODS

Aerob bacterial and fungal throat flora of 55 patients that hospitalized at Medical School of Ataturk University, Department of Hematology with leukemia and lymphoma were sampled. The control group was consisted of 30 healthy subjects. The specimens were collected with proper methods, cultured and identified.

Tablo 1. The distribution of non-indigeneous bacteria according to the disease.

	Number of patients	Normal throat flora %	Non-indigenous bacteria A	Fungus B	A + B
AML	12	4(33.3)	2	2	4
ALL	• - İ r	2(22.2)	1 . 2		4
CML	2	- (0.0)		1	1
CLL	6	2 (33.3)	1	2	1
Hodgkin	13	5 (38.5)	2	5	1
Non-Hodgkin	13	2(15.4)	5	2	4
Total	55	15(27.3)	11	14	15

AML=" Acute myelocytic leukemia..
ALL= Accute lymphocytic leukemia.
CML= Chronic myelocytic leukemia.
CLL= Chronic lymphocytic leukemia.

Table 2. The types of non-indigeneous bacteria and their distribution according to the disease.

	Number of patients	Total number of Non-indigenous	Total number of isolated non-indigenous bacteria	β. hem. strep.	Staf coag (+)	Staf coag (-)	P. aeroginosa	Klebsiellae	A. serogenes	E. coli	Proteus
AML	12	6 (50.0)	11	3	2		1		1	-	-
ALL	9	5 (55.6)	11		5	1	1	-	-	1	-
CML	2	1 (50.0)	W$d#	t		-	-	-	-	-	-
CLL	6	2 (33.3)	2	2	-	-	-	-	-	-	-
Hodgkin	13	3(23.1)	âà	2	-	-	-	1	-	-	1
Non-Hodgkin	13	9 (69.2)	5	4	1	.1 :	1	-	1	1	-
Total	55	26 (69.2)	38	15	8	4	3	3	2	2	1

The antimicrobial suspectibility of non-indigenous microorganisms were tested according to Kirby-Bauer method.

RESULTS

Forty male and 15 female subjects with leukemia and lymphoma were investigated in this study. The average age was 30.2 (range 19 months–75 years).

The distribution of non-indigeneous microorganisms according to the type of disease was given in Table 1.

In 7 subjects; more than one type of non-indigenous microorganisms were observed. The types and their distributions among the malignant disease were as in Table 2. In Hodgkin lymphoma group normal throat flora was mostly observed, while in Non-Hodgkin lymphoma patients and acute lymphocytic leukemia patients non-indigenous bacteria were observed.

Table 3. The distribution of fungus colonisation according to the disease.

	Number of patients	Number of patients with fungus colonisation (%)
AML	12	6 (50.0)
ALL*	9	6 (66.7)
CML	2	2(100)
CLL	6	3 (50.0)
Hodgkin	13	6 (46.2)
Non-Hodgkin	13	6 (46.2)
Total	55	29 (52.7)

* One patient had both candida and pénicillium.

In chronic myeloytic leukemia and acute lymphocytic leukemia; isolated fungi and their distribution was shown in Table 3.

Table 4. The distribution of fungus colonisation according to the age.

Age	Number of patients	Normal throat flora (%)	Non-indigenous bacteria A	Fungus colonisation B	A + B
0-15	22	5 (22.7)	6	4	7
16-35	9	3 (33.3)	2	1	3
35-55	12	4(33.3)	2	4	2
56-75	12	3(25.0)	1	5	3
Total	55	15(27.3)	11	14	15

Table 5. The effect of chemotherapy on throat flora.

	Number of patients	Colonized non-indigenous bacteria (%)	Colonized fungus (%)
I. Culture	55	18(32.7)	14(25.5)
II. Culture	44	17(38.6)	12 (27.3)
III. and Others	25	12(48.0)	12(48.0)

Table 6. The effect of neutropenia on throat flora.

	Number of culture	Colonized non-indigenous bacteria (%)	Colonized fungus (%)
With sufficient neutrophils	82	25 (30.5)	21 (25.6)
With Neutropenia	42	22 (52.4)	17(40.5)

Table 7. The effect of antibiotics on the throat flora of the patients with leukemia and lymphoma.

	Number of culture	Number of cultured non-indigenous bacteria (%)	Number of cultured fungi (%)
Before using antibiotics	25	13(52.0)	7 (28.0)
After antibiotics usage	31	9 (29.0)	13(42.0)

The non-indigenous bacteria were isolated from the patients in 0-15 years old and 56-75 years old. Table 4 shows the relation between age and non-indigenous bacteria distribution.

When the first and other cultures were investigated, performed chemotherapy and long stay In hospital caused an increase in both non-indigenous microorganisms and fungi (Table 5).

In Table 6 the effect of neutropenia on the throat flora patients with leukemia and lymphoma was given. The presence of neutropenia was associated with an increase in isolation of non-indigenous microorganisms and fungi.

The effect of antibiotics on the throat flora of the patients with leukemia and lymphoma was given in Table 7. It was observed that by using antibiotics the colonisation of the non-indigenous bacteria decreased while colonisation with fungi increased.

The application of antifungal therapy in hematological malignancies patients with caused a decrease in fungus colonisation. In Table 8 the effect of antifungal drugs on hematological malignant disease were given.

Antibiotic sensitivity tests were applied to the isolated non-indigenous bacteria (Table 9).

Table 8. The effect of antifungal usage to the throat flora of the patients with leukemia and lymphoma.

	Number of culture	Fungus colonisation (%)
Cultures before antifungal usage	12	9 (75.0)
Cultures after antifungal usage	19	4 (21.0)

In the control group; fungus colonisation were not observed and only in 3 cases p hemolytic streptococcus were observed.

DISCUSSION

As given in Table 1; 27% of the study group had normal throat flora while the rest (%72,7) had non-indigeneous bacteria colonisation.

It was reported that the occurence of infection due to the non-indigeneous bacteria has a high probability for the patients with depressed immunity (7,8).

In our study population, non-indigeneous bacteria were observed in 47% of all patients (Table 2). It was previously reported that gram negative bacteria caused most of the infections in patients with malignancies (3,5). Gram positive non-indigeneous bacteria mostly were p hemolytic streptococci. In the 3 subjects of the control group p hemolytic streptococci were isolated. This event might be induced by the climate conditions in Erzurum during winter time.

As seen in Table 3; fungus colonisation were observed in 52.7% of patients (1,8).

Normal throat flora were cultured in Hodgkin's lymphoma (38.5%) and non-indigeneous bacteria were observed in Non-Hodgkin Lymphoma (62.2%) and acute lymphocytic leukemia (55.6%). Fungi were isolated from chronic myeloctic leukemia (100%) and acute lymphocytic leukemia (66.7 %).

In our study normal throat flora was mostly produced in Hodgkin lymphoma. However further studies are required for this point because the relationship between the infections and microorganisms cultured in the the throat flora of immunocompromized patients are not defined very well (9-10). Non-indigenous microorganisms were mostly observed in 0-15 age children or 56-75 age adults. These results are in accordance with the depressed immunity in children and adults.

As the duration of stay in the hospital, an increased rate of non-indigeneous bacterial colonisation were observed. These results are in accordance with the previous reports in the literatures (8).

An increased colonisation rate of non-indigeneous bacteria were observed as the number of neutrophils decreased. This finding was also supported by the previous reports (2,3).

Antibiotics caused decreased rate of colonisation of non-indegeneous bacteria, but increased fungus colonisation. The discussion still continues on the usage of prophyloctic antibiotics (6,8). We have suggested that antibiogram results in the malignant

Table 9. The antibiotic sensitivity of theisolated non-indigenous bacteri.

	Number of sensitive bacteria	Number of the bacteria that test applied	Percent age'of sensitivity (%)
1.Ceftazidime	39	47	83.0
2.Ciprofloxacin	37	47	78.7
3.0floxacin	36	47	76.6
4. Amikasin	10	14	71.4
5. Cefotaxime	33	47	70.2
6.Amp + Sulbactam	32	47	68.1
7.Rifampin	22	33	66.7
8.Amox-Clv. A.	31	47	66.0
9.Netilmicin	9	14	64.3
10.Cef riaxsone	30	47	63.8
11.Erythromycine	21	33	63.6
12.Cefuroxime	29	47	61.7
13.Cefoperazone	27	47	57.5
14.Tobramycin	8	14	57.1
15.Clindamycin	18	33	54.6
16.TMP-SMX	25	47	53.2
17.Lincomycine	17	33	51.5
18.Gentamycin	7	14	50.0
19.PenisilinG	16	33	48.5

hematological diseases could be used in directing therapy only neutropenia and fewer occur. Otherwise; the detection of colonized microorganisms do not provide evidence for the indication of treatment (1.5).

In this study, nistatin (5 patients), ketoconazole (5 patients), and fluconazole (2 patients) were used as antifungal drugs. Although it is claimed that; the usage of antifungal theraphy caused decreased fungus colonisation, further studies are required for conformation.

Antibiotic sensitivity tests were applied to the isolated non-indigeneous bacteria and they were mostly sensitive to ceftazidime, ciprofloxacin, ofloxacin, amikacin and cefotoxime (Table 9).

Lösemi ve lenfomalı hastalarda aerob bakteriyel ve fungal boğaz florası

55 lösemi ve lenfomalı hasta ile 30 sağlıklı kontrolün aerob bakteriyel ve fungal boğaz floraları incelendi. Üretilen flora dışı mikroorganizmaların türleri ve hastalık tiplerine göre dağılımının yanı sıra, yaşın, kemoterapi ve hastanede kalma süresinin, nötropeninin, antibiyotik ve antifungal kullanmanın, hematolojik maligniteli hastaların boğaz floraları üzerine etkileri araştırıldı. Üretilen patojen bakterilere antibiyotik duyarlılık testleri uygulandı.

Sonuçta en sık izole edilen bakteriler gram pozitiflerde p hemolitik streptococcus, coagulase pozitif stafilokok, gram negatiflerde Pseudomonas aeruginosa ve klebsiella oldu. Mantarların tamamı penisilyum olan biri dışında kandida idi. Normal flora bakterileri en sık olarak (%38.5) Hodgkin lenfoma grubunda görülürken; patojen bakteriler en sık Non Hodgkin (%69.2) ve akut lenfositik lösemi (%55.6) gruplarından, mantarlar ise kronik miyelositik lösemi (% 100) ve akut lenfositik lösemi (%66.7) olgularından üretildi. Çocuklarda ve yaşlılarda flora dışı mikroorganizma üreme sıklığının saptanması yanısıra; kemoterapi ve uzun süre hastanede kalma ile, nötropeninin etkisi ile boğaz florasında flora dışı mikroorganizma üreme sıklığının arttığı (p<0.05), profilaktik antibiyotik kullanmanın patojen bakteri üreme oranını azalttığı (p<0.05) fakat mantar üreme oranını artırdığı (p<0.05), profilaktik antifungal Haç kullanımının ise boğaz kültüründe mantar üremesi olasılığını düşürdüğü saptandı (p<0.05). Antibiyogram sonucunda duyarlı antibiyotikler arasında ilk sıralar; ceftazidime, ciprofloxacin, ofloxacin, arnikasın, cefotaxime almıştır. [Turk J Med Res 1994; 12(2): 73-77]

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