

From the laboratories in Maadi Hospital, Cairo  
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## Incidence of yeasts in sputa and urine in chest and urinary diseases

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The aim of this work is to determine the incidence of yeasts in sputum and urine samples sent for routine bacteriological examination; thus deviating the attention to the role of yeasts in chest and urinary diseases, especially with the extensive use of antibiotics.

### Material and methods

500 samples of sputum as well as 1163 urine samples were examined mycologically, besides the routine bacteriological testing. The sputum was collected in the morning from patients with chest diseases after thorough wash with water. The sputum was treated with 1% pancreatin in equal volumes to be digested, then centrifuged and 2 films were prepared from the sediment, one film stained by Gram and the other by Ziehl Neelsen. The digested sediments were cultured aerobically on blood and chocolate agar, MACCONKEY and SABOURAUD agar as well as on LOEWENSTEIN-JENSEN media and anaerobically on thioglycolate broth.

The urine samples were collected from patients with urinary diseases by mid-stream procedure. Wet films and Gram stained films were examined. Viable counts were carried out utilizing shake specimen technique, and sediment was cultured on nutrient and blood agar, MACCONKEY and SABOURAUD gar.

After overnight incubation at 37° C, the bacterial colonies were identified morphologically and biochemically. Yeast colonies were examined on corn meal agar after 48 hours.

### Results

#### A. Sputum

Table 1: Incidence of fungi in sputum from patients with chest diseases

	Number
<i>Candida albicans</i>	76
Other <i>Candida</i> species	10
<i>Torulopsis</i>	7
<i>Rhodotorula</i>	2
<i>Geotrichum</i>	23
<i>Aspergillus niger</i>	34
<i>Phialophora</i> sp.	12
<i>Penicillium</i> sp.	11
<i>Paecilomyces</i>	5
<i>Aspergillus fumigatus</i>	2
<i>Cephalosporium</i>	2
<i>Rhizopus</i>	1
Total	185

500 sputum samples were examined. *Candida albicans* was isolated on 76 occasions; always together with different types of bacteria. Other species of *Candida*, *Torulopsis* and *Rhodotorula* were also encountered together with bacteria. *Aspergillus niger* and other moulds were also isolated from 70 samples (Table 1). No acid fast bacilli were met with in films stained with Ziehl-Neelsen stain.

*Candida albicans* was the only microorganism isolated alone in 2 samples. In 18 samples *C. albicans* was accompanied with one type of bacteria; in 20 samples with two types; in 31 samples with 3 types and in 5 samples with 4 types of bacteria. (Table 2).

Table 2: Frequency of bacteria isolated together with *Candida albicans*

	Number
<i>Candida albicans</i> alone	2
<i>Candida albicans</i> + one type of bacteria	18
<i>Candida albicans</i> + two types of bacteria	20
<i>Candida albicans</i> + three types of bacteria	31
<i>Candida albicans</i> + four types of bacteria	5
Total	76

Together with *C. albicans* the following bacteria were isolated in order of frequency: *Neisseria* (60), *Staphylococcus* (45), of which 30 were coagulase positive,  $\alpha$ -hemolytic *Streptococcus* (30), *Diphtheroids* (21), *E. coli* (12), *Klebsiella* (11), *Pseudomonas* (5) and  $\beta$ -hemolytic *Streptococcus* (1).

#### B. Urine

1163 urine samples were cultured. Yeasts were isolated from only 56 samples, bacteria from 478 and no microorganisms from the remaining 629 samples. Yeasts were alone on 20 occasions and together with bacteria on 36 occasions. As it is seen in Table 3, *C. albi-*

Table 3: Yeasts isolated from urine

No of samples examined	1163
No of samples presenting yeasts	56
<i>Candida albicans</i>	24
Other <i>C. species</i>	9
<i>Torulopsis</i>	19
<i>Trichosporon</i>	2
<i>Rhodotorula</i>	2
Total	56

*cans* was isolated from 24 samples. In 8 samples it was the only microorganism found in urine and in 12 it was accompanied with *E. coli*, while in 4 cases it was found together with coagulase positive *Staphylococcus*. The other species of *Candida*, *Trichosporon* and *Rhodotorula* were all isolated together with different types of bacteria.

Torulopsis species were the only microorganisms isolated from 12 samples. In other 7 samples Torulopsis species were accompanied with bacteria.

In the 478 bacterial isolations, mainly *E. coli*, coagulase positive *Staphylococcus*, *Pseudomonas* and *Proteus* bacteria were identified.

### Discussion

As far as sputum is concerned, *C. albicans* was reported by many authors as commensals in the mouth and increases in patients treated with antibiotics for a long period (CHILDS, 1956, SHARP, 1954 and WEGMANN, 1954). SICHERT and MAHNKE (1960) isolated *C. albicans* from about half the bronchial trees at necropsy of 375 cases.

In this study, *C. albicans* was isolated from 76 sputum samples out of 500 samples examined. It was repeatedly erupted in cultures from the same patients. The accompanying organisms were mostly *Neisseria pharynges*, coagulase positive *Staphylococcus*,  $\alpha$ -hemolytic *Streptococcus* and diphtheroids. In such mixed infections we could not blame one or more of these organisms as being the cause of infection alone, as the presence of *C. albicans* could be the cause. Most of the 500 cases were patients with chronic asthmatic bronchitis, bronchiectasis and empyema. Some of the patients were complaining of metabolic disorders as diabetes, others suffered from chronic malignancy. All of them were under treatment with antibacterial antibiotics for long times without apparent improvement, although the bacteria isolated from such cases were found to be sensitive in vitro to the used antibiotics. However, some cases, where *C. albicans* was isolated as well, responded to treatment with colimycin. In this study 70 % of the *C. albicans* strains were found to be sensitive to colimycin.

*Candida* infection of the urinary tract was reported by many authors (ENGELHARD, 1948, TAYLOR and RUNDLE, 1952, VERGEZ and SIMON, 1953, MELONI, 1955, GILLAM and WADELTON, 1958 as well as RAPHAEL and BADGERY, 1958). HANTSCHKE et al., 1970, diagnosed urinary tract infection in 9 children, 6 of them were infants. All children had received large doses of various antibacterial antibiotics.

Out of 1163 urine samples examined in this work, yeasts were isolated from 56 samples. In 20 patients yeasts only were isolated, namely *C. albicans* and *Torulopsis* species. These patients complained from chronic pyelonephritis, polycystic diseases and bilateral renal calculi. Some had in addition diabetes mellitus or malignancy. HALEY, 1965 isolated *C. albicans* from 3 % of urine samples from 51 patients with urinary infection. In our examinations yeasts were recovered from 56 out of 1163 samples (about 4 %), whereas *C. albicans* was isolated from about 2 %. On the other hand, *Torulopsis* species were found in 1.63 % of the samples.

The presence of yeasts in sputum and urine must be cautiously evaluated, without being influenced by the opinion that such yeasts are normally found in such materials and are therefore harmless. RIETH (1970) drew attention to this point. He mentioned that yeasts are in a position to cause meningitis, encephalitis, endocarditis, myocarditis or glomerulonephritis, either as primary or secondary invaders. Therefore, the elimination of yeasts is very important, to get rid of a threatening microorganism waiting for the suitable conditions to cause a disease.

### Summary

Sputum and urine samples were mycologically examined in the newly established Mycology Laboratory in Maadi-Hospital, besides the routine bacteriological testing. From the 500 sputum samples examined, *Candida albicans* was isolated on 76 occasions. In 2 samples *Candida albicans* was the only organism found. In 18 samples *Candida albicans* was isolated together with one type of bacteria; in 20 samples with 2 types of bacteria; in

31 samples with 3 types of bacteria and in 5 samples with 4 types of bacteria. The mostly isolated bacteria were *Neisseria*, *Staphylococcus*,  $\alpha$ -hemolytic *Streptococcus*, Diphtheroids, *Escherichia coli*, *Klebsiella*, *Pseudomonas* and  $\beta$ -hemolytic *Streptococcus*. Yeasts were isolated from 56 out of the 1163 urine samples examined; bacteria from 478 and no microorganisms from the remaining 629 samples. Yeasts were alone on 20 occasions and together with bacteria on 36 occasions. *Candida albicans* was the only microorganism in 8 samples and *Torulopsis* was isolated alone in 12 samples. All samples were taken from patients suffering from chest and urinary troubles and were under treatment with antibacterial antibiotics for a long time without any apparent improvement.

### Zusammenfassung

Sputum- und Urinproben wurden in dem neu eingerichteten mykologischen Laboratorium im Maadi-Krankenhaus bakteriologisch und mykologisch untersucht. Aus den 500 untersuchten Sputumproben wurde *Candida albicans* in 76 Fällen nachgewiesen. Nur in zwei Proben war *Candida albicans* der einzige nachweisbare Keim. In 18 Proben wurde *Candida albicans* zusammen mit 1 Bakterienart gefunden; in 20 Proben zusammen mit 2 Bakterienarten; in 31 mit 3 Bakterienarten und in 5 Proben war *Candida albicans* von 4 Bakterienarten begleitet. Die isolierten Bakterien waren vorwiegend *Neisseria*, *Staphylokokken*,  $\alpha$ -hämolytische *Streptokokken*, Diphtheroide, *Escherichia coli*, *Klebsiella*, *Pseudomonas* und  $\beta$ -hämolytische *Streptokokken*. In 56 von 1163 Urinproben konnten Hefen nachgewiesen werden, in 478 Proben Bakterien und in 629 Proben waren keine Keime nachweisbar. Hefen wurden allein isoliert aus 20 Proben und zusammen mit Bakterien aus 36 Proben. *Candida albicans* war der einzige nachweisbare Keim in 8 Proben; in 12 Proben konnten nur *Torulopsis*-Arten gefunden werden.

Alle untersuchten Proben stammten von Patienten mit Atem- und Harnwege-Erkrankungen, die lange Zeit mit antibakteriellen Antibiotika ohne Erfolg behandelt worden waren.

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