Frequency of Proteus isolates in different samples and their antibiogram profile.

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Abstract

This study was performed in Tikrit City in General Saddam Hospital to assess the frequency of Proteus isolates in various samples (wound swabs, ear swabs, high vaginal swabs and urine samples) and their antibiotic susceptibility. The study included 538 bacterial isolates distributed as follows: 70 isolates from wound swabs, 73 isolates from ear swabs, 35 isolates from high vaginal swabs and 360 isolates from urine samples.

The laboratory investigations revealed that the highest frequency of Proteus isolates was found in wound swabs (18.5%), followed by ear swabs (13.6 %), high vaginal swabs (11.4 %) and urine samples (9.2 %). Susceptibility testing revealed that gentamicin and cefotaxime are the most effective antibiotics while tetracycline and ampicillin are the least effective ones. It is concluded that the highest frequency of Proteus isolates is found in wound swabs and the most effective antibiotics are gentamicin and cefotaxime.

Introduction

Proteus species produces infection in humans only when the bacteria leave the intestinal tract. Proteus is Gram- negative bacillus, facultative anaerobic bacteria, non-lactose fermenter, motile, some spp. are indole positive. Have tendency to swarm on agar surface (1). Proteus has the ability to split urinary urea into ammonia, by which trapping hydrogen ions leading to an alkaline urine and the risk of stone formation (2).

Proteus mirabilis is the commonest species of human infections, after E. coli it is the commonest cause of urinary tract infections (UTI) especially in young males and elderly of both sexes (3, 4).

Proteus spp. have also been recovered from infected wounds and abscesses, and from cases of otitis media, meningitis, septicemia and osteomylitis (5). The aim of this study

was to assess the frequency of Proteus isolates in various samples (wound swabs, ear swabs, high vaginal swabs and urine samples) and their antibiotic susceptibility.

Materials and Methods

A cross-sectional study was carried out in Tikrit City in General Saddam Hospital to evaluate the frequency of Proteus in different samples with its antibiotic susceptibility. The study included 538 bacterial isolates distributed as follows:

1-Wound swabs (W.S.)...70 isolates.
2-Ear swabs (E.S.)...73 isolates.
3-High vaginal swabs (H.V.S.)...35 isolates.
4-Urine samples... 360 isolates.

Each sample was cultured on both MacConkey agar and blood agar. Proteus spp. was identified according to Gram stain and morphological and cultural characteristics. Sensitivity test was performed regarding each culture exhibited Proteus spp. The antibiotics used in sensitivity test included:

1-Cefotaxime (CTX).
2-Gentamicin (GN).
3-Tobramycin (TOB).
4-Carbenicillin (CAR).
5-Cephalothin (KF).
6-Rifampicin (RF).
7-Tetracycline (TE).
8-Ampicillin (AMP).

Results

Table 1 shows the frequency of Proteus in different samples. Wound swabs were the most common source of Proteus isolates (18.5%), followed by ear swabs (13.6 %), high vaginal swabs (11.4 %) and urine samples (9.2 %).

Table 2 shows the antibiotic-sensitivity patterns of Proteus isolated from different samples. Gentamicin and cefotaxime were the most effective antibiotics against Proteus isolates that obtained from different samples, although there were some differences in the percentage of susceptibility to these antibiotics among the different samples.

Discussion

The current study revealed that the highest frequency of Proteus isolates was found in wound swabs (18.5%), followed by ear swabs (13.6 %), high vaginal swabs (11.4 %) and urine samples (9.2 %).

Al-Obaidi (6) confirmed that 14% of Proteus was responsible for urinary tract infections (UTI), while Orrete (7) showed that Proteus was found in 9% of urine specimens. On the other hand, Ashoor and Makoud (8) found Proteus in 20% of ear swabs obtained from cases of otitis media. A bacteriological study of purulent samples from cases of otitis media revealed that 82 % were positive and Proteus constitutes 18% of these cultures (9). Al-Hussieny (10) demonstrated the presence of Proteus in 10% of swabs obtained from cases of otitis media.

Another researcher mentioned that Proteus was found in 8.5% of isolates from burned patients in Najaf (11). El-Tahawy (12) confirmed the presence of Proteus in 18% of isolates from diabetic foot infections. At the same time, another study showed that Proteus constituted 18.2% of the causative microorganisms of wound infections (13).

The current findings showed that GN and CTX were the most effective antibiotics against Proteus isolates that obtained from different samples. Al-Obaidi (6) reported that Proteus was resistant to GN in 24% of isolates. Otherwise, El-Tahawy (12) mentioned that the sensitivity to GN

was 94%, while another study revealed that the sensitivity to GN was 80% (10). Orrete (7) showed that the susceptibility to GN was 56%. Another study confirmed that Proteus strains were sensitive to CTX and GN (14). Al-Hussieny (10) found that the sensitivity to CTX was 94.3%. However, different strains of the same bacteria may exhibit different susceptibility patterns against the same antibiotic.

The present study revealed that TOB and CAR were active. According to TOB, W.S. showed sensitivity in 53.8% of isolates, while E.S. showed sensitivity in 70%, H.V.S. showed 75% and urine samples 63.6%. A higher sensitivity rate to TOB (81.4%) was reported by Al-Hussieny (10), while Al-Obaidi (6) found that Proteus was resistant to TOB in 46% of isolates.

The current work showed that the highest sensitivity rate to CAR was in H.V.S. (75%), followed by W.S. (61.5%), urine samples (57.5%) and E.S. (50%). A higher rate was recorded by Al-Hussieny (10) who reported the sensitivity of Proteus to CAR in 87.1% of isolates, while another researcher revealed that Proteus was insensitive to CAR (14). On the other hand, another report demonstrated that CAR was the most effective antibiotic against Proteus isolated from burned patients (11).

In this study, the least effective antibiotics were different with different samples. Wound swabs exhibited the least sensitivity rate to AMP (15.3%) among antibiotics used. The same result was obtained from urine samples that exhibited the least sensitivity rate to AMP (15.1%). Proteus isolates that obtained from H.V.S. showed sensitivity to AMP in 25%, while E.S. yielded higher result (40%).

Al-Obaidi (6) mentioned that 88% of Proteus isolates were resistant to AMP, while El-Tahawy (12) found that 67 % of Proteus isolates were resistant to AMP. Different result was obtained by Orrete (7) who reported that 64% of Proteus isolates were sensitive to AMP. This finding may be contributed to differences in susceptibility patterns of this pathogen.

According to E.S., the least sensitivity rate was to TE (20%). This antibiotic also gave the least effect against bacteria isolated from H.V.S. (25%). However, bacteria isolated from W.S. gave susceptibility to TE in 23.07% while urine samples gave susceptibility in 30.3% of isolates. Al-Hussieny (10) found that the sensitivity rate to TE was 18.2%. Another report demonstrated that Proteus isolates were resistant to TE (11). Also another study revealed that Proteus was insensitive to this antibiotic (14).

The second least effective antibiotic against bacteria isolated from E.S. was RD, which was effective against 30% of isolates, while the effective rate against bacteria obtained from urine samples was 21.2%. Bacteria that isolated from W.S. was sensitive to this antibiotic in a rate 30.7%, while 50% of bacteria isolated from H.V.S. was susceptible to this antibiotic. On the other hand, another report revealed that Proteus was

sensitive to RD (11). Also Al-Hussieny (10) found that 78.6% of Proteus isolates were sensitive to RD. Al-Obaidi (6) confirmed that 47% of Proteus isolates were resistant to RD.

Conclusion

The study revealed that the highest frequency of Proteus isolates was found in wound swabs and the most effective antibiotics were gentamicin and cefotaxime.

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Table 1: Frequency of *Proteus* isolates in different samples.

Type of sample	No. of samples yielding growth	Samples with growth of *Proteus*	
		No.	%
W.S.	70	13	18.5
E.S.	73	10	13.6
H.V.S.	35	4	11.4
Urine	360	33	9.2
Total	538	478	60

Table 2: Sensitivity *Proteus* isolates to antibiotics.

Type of antibiotic	Sensitive isolates from							
	W.S.		E.S.		H.V.S.		Urine	
	No.	%	No.	%	No.	%	No.	%
CTX	11	84.6	9	90	4	100	28	84.8
GN	10	76.9	8	80	4	100	30	90.9
TOB	7	53.8	7	70	3	75	21	63.6
CAR	8	61.5	5	50	3	75	19	57.5
KF	5	38.4	5	50	2	50	14	42.4
RD	4	30.7	3	30	2	50	7	21.2
TE	3	23.07	2	20	1	25	10	30.3
AMP	2	15.3	4	40	1	25	5	15.1