

**USAGE OF ANTIMICROBIAL AGENTS IN
PAEDIATRIC WARDS AT ST. LUKE'S HOSPITAL**

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Introduction

A clinical study on antibiotic therapy in paediatric surgical, medical and special care wards of St. Luke's Hospital, Malta, was carried out by means of a survey over a 10 week period.

The scope of this study was to critically assess the necessity of treatment and the subsequent antibiotic choice, dosage, route of administration and the duration of treatment in relation to the nature of infection and its outcome. Besides analysis of the current antibiotic prescribing practice, patient history files were also consulted to determine the extent of prescribing of non-formulary and/or special items, as well as to analyse microbiological reports for the usual and possible unusual patterns of infection and sensitivity.

Methodology

During the patients' stay at hospital, information on the following characteristics was gathered daily and recorded on survey forms prepared beforehand; by consulting patient histories, treatment charts and asking the appropriate staff when necessary:

- * Ward
- * Personal details
- * Diagnosis
- * Antimicrobial therapy
- * Microbiology laboratory reports
- * Duration of stay in hospital

After the patients were discharged, all the histories of those patients receiving antibiotics during the 10 week study period were reviewed for completion's sake. Microbiology laboratory reports which might have been included into the patients' histories after their discharge; as well as the discharge letter, which gave both the confirmatory diagnosis and information on treatment given to the patients on discharge (if any), were updated.

This enabled thorough assessment of the current hospital paediatric prescribing practices from which problem areas and short-comings were identified. By careful analysis of such problems a number of recommendations were proposed. These were aimed at enabling clinicians to treat patients with maximal clinical efficacy and with due

consideration to the development of microbial resistance, thereby improving such practices.

Attempts were made to compare the trends and extent of antimicrobial use to that of other countries. However, no similar studies were available for comparison.

Analysis of this information was carried out with the help of the computer program DBASE 3PLUS.

A second survey was carried out amongst paediatricians and senior house officers (n=12). It involved the establishment of:

- i) the influencing factors on the choice of antibiotics
- ii) the importance of the pharmacist as part of the health care team on paediatric wards
- iii) the roles the ward pharmacists should carry out
- iv) the frequency with which doctors consult the pharmacist at IPD information unit, and
- v) whether doctors and nurses would perform their respective duties with greater ease and efficiency if the pharmacist had to undertake the established roles on the ward, thereby providing a better health service to the patient

Results

A total of 913 patients were admitted to the paediatric wards (Karin Grech) at St. Luke's Hospital during the 10 week study period (1/7/91 - 8/9/91), out of which 28.15% (n=257) received antimicrobial chemotherapy.

Prevalence was seen for neonates (0 - 30 days) in S.C.B.U., for infants (up to 1 year) and children (1 up to 5 years) in the medical wards, and for adolescents (>5 - 14 years) in the surgical ward. This helps understand the trend of antibiotic usage as a percentage of total patients admitted to the respective wards, as follows:

S.C.B.U. (55.56%) > Medical wards (27.59%) > Surgical ward (24.58%).

It was also noted that the incidence of male admission was much higher than that of females; since 65.27% (n=168) were male admissions while the rest, 34.63% (n=89) were female admissions.

Admission rates of patients on antimicrobial therapy followed the sequence:

Adolescents (35.02%) with a mean age of 9.5 years > children (31.9%) with a mean age of 2.8 years > neonates (16.7%) with a mean age of 6.1 days > infants (16.3%) with a mean age of 0.5 years.

This implies that paediatric patients remain mainly prone to infection to an average age of about 10 years.

7.78% of patients (n=20) receiving antimicrobial therapy during this study period were hypersensitive to an antibiotic. Most of these reactions had been known previous to hospital admission, while 0.78% (n=2) were found to be allergic during their stay in hospital. Hypersensitivity reactions were mainly seen in adolescents followed by children, while no reactions were noted in neonates and very rarely in infants.

The diagnosis of the paediatric patients admitted to the respective wards involved a wide array of conditions, which were classed according to the systems involved as well as the indication of therapy. A miscellaneous group was also included for particular conditions which did not involve any specific system. The incidence of infection in paediatric wards over the 10 week study period, with respect to the specific/non-specific systems, was established, where the descending order was seen to follow:

Respiratory tract infections 46.83% > gastrointestinal tract infections 10/73% > ear infections 8.29% > urinary tract infections 7.81% > septic screening 6.34% > neurological infections 4.88%, and other infections ranging from 3.90% to 0.49%.

Neonates, a high proportion of which are usually admitted to S.C.B.U., are usually kept in hospital for a longer period than the other age groups (13 - 15 days). Children and infants, who are mainly admitted to medical wards and to a lesser extent to surgical ward, require 7 - 8 days admission. Adolescents, who are mainly admitted to surgical ward followed by medical wards, had a mean duration of stay of 6 - 7 days.

62.26% (n=160) of patients receiving antimicrobial therapy had a suspected or confirmed infection. The rest, 37.74% (n=97), were receiving antimicrobial therapy on a prophylactic basis either pre/post

operatively or for the prevention of infection in immunosuppressed or susceptible patients.

42.41% (n=109) of those with a suspected or confirmed infection had a single infection while 19.84% (n=51) had multiple infections.

The paediatric patients receiving therapy for a therapeutic indication suffered from a total of 205 infections. The majority of these infections were community acquired 97.56% (n=200) while 2.44% (n=5) are nosocomial infections.

59.53% (n=153) of patients received single therapy and 40.47% (n=104) received combination therapy.

Predominance of single therapy seen for infants, children and adolescents, as contrary to combination therapy in neonates; correlates with prevalence of single therapy in medical (65% [n=79]) and surgical wards (73% [n=74]) and combination therapy in S.C.B.U. (100% [n=35]).

Predominance of single therapy was observed (approximately 51.40% (n=55) for single and 60.40% (n=32) for multiple infections) to be given for therapeutic indications. On the other hand a higher prevalence, 68.00% (n=66), of single therapy over combination therapy was seen when antimicrobial drugs were prescribed prophylactically.

During the 10 week study period 36 different antimicrobial agents were used, out of which 10 were used only on one occasion. A total of 518 patient antimicrobial courses were administered. 30.89% (n=160) of these patient courses were administered on prophylactic basis, while 63.32% (n=328) were administered for a suspected infection and 5.79% (n=30) for a confirmed infection.

The mean number of antimicrobials per patient was estimated to be 2.02; where the number of antimicrobial agents given per patient ranged from 1 - 9 drugs. Broad class classification of antimicrobial agents shows that antimicrobial usage in paediatric wards (over a 10 week period), follows the trend:

Penicillins 43.05% > cephalosporins 17.18% > aminoglycosides 11.58% > macrolides 6.95% > nitroimidazoles 5.79% > antifungals 4.25% > others ranging from 2.90% down to 0.19%.

The second survey revealed that all doctors agreed that the most important influencing factor on antimicrobial choice was the likely infecting organism 100% (n=12). This was closely followed by severity of infection and bacteriological reports, 83.33% (n=10). Other factors of equal importance, 50% (n=6), included: formulation of the antimicrobial agent, local resistance patterns, availability of the drug and the costs. Various doctors seemed to take into consideration certain other factors, such as: popularity of the drug 16.67% (n=2), whether the patient was immunosuppressed 8.33% (n=1), patient tolerance 8.33% (n=1), incidence of adverse effects 8.33% (n=1), and knowledge and experience of the drug 8.33% (n=1).

The majority of doctors, 91.67% (n=11) consider the pharmacist as an important element in the health care team on paediatric wards, while one doctor 8.33% said that the pharmacist is only needed at times. These doctors suggested various roles the ward pharmacist could carry out:

Drug information, prescription checking, and preparation of extemporaneous preparations 100% (n=12), followed by drug stock take on ward and surveillance of side effects/adverse drug reactions 66.67% (n=8), and finally monitoring drug interactions 58.33% (n=7). A few also suggested that the pharmacist should be cost-conscious and should create a liaison with the nursing staff; the pharmacist should also be able to cut down on useless form filling, covering letters and all the red tape designed to discourage doctors from prescribing certain medications.

Doctors, 91.67% (n=11), also agreed that if the pharmacist performed the above roles, both the doctors and nurses could perform their respective duties with greater ease and efficiency, thereby providing a better health service to the patient; one of which added that this would help to make less mistakes. A doctor 8.33% (n=1) said that the latter would only occur at times.

In spite of this favourable response, the majority of the doctors 66.67% (n=8) seldom consult the pharmacist at IPD information unit, while only 33.33% (n=4) did so frequently.

Conclusion

On the whole the use of antibiotics in hospitalised children was found to be less than expected. There are other instances where antibiotics are used prophylactically for short periods of time. Chemoprophylaxis

seemed to be high in paediatric wards (38%). In the majority of cases, such as in preterm cases at S.C.B.U. which are highly susceptible to infection, and in genito-urinary tract surgery. On the other hand, other cases were unjustified, e.g. trauma.

An interesting trend of higher incidence of male admission was noted in all wards which had also been seen in other studies carried out in various S.C.B.U./N.I.C.U., conducted both locally and in Boston, U.S.A. and Italy.

A low percentage of patients (7.78%) receiving antimicrobial therapy during this study were hypersensitive to an antibiotic. However, only 0.78% were found to be allergic during their stay in hospital. In the local study hypersensitivity reactions were mainly seen in adolescents followed by children, while no reactions were noted in neonates and very rarely in infants.

A low incidence of nosomial infections (2.44% of therapeutic indications) due to immunosuppression or as a result of cross infection, were found.

Combined preparations were probably used more often than was really necessary but there may be a case for this in S.C.B.U.

The range of antimicrobial items used was not great, since only 36 different preparations were used, out of which 10 were used for only a single patient and a mean number of antimicrobial agents per patient was estimated to be 2 (range 1 - 9).

The majority of paediatricians and senior house officers consider the pharmacist as an important element in the health care team on paediatric wards.

Most doctors agreed that if the pharmacist performed the suggested roles previously referred to in the results, both the doctors and nurses could perform their respective duties with greater ease and efficiency, thereby providing a better health service to the patient.

References

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