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STUDY OF TIME OF DELAY FROM THE TIME OF ADMISSION TO ADMINISTRATION OF THE FIRST DOSE OF ANTIBIOTIC IN PEDIATRIC PATIENTS DIAGNOSED WITH SERIOUS INFECTIONS

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ABSTRACT

Background: We all are sure for one fact that the patients suspected of having serious bacterial infections should receive antibiotic therapy as early as possible and there are grounds of concern over the delay in administration of the first dose of antibiotic. **Methods:** Retrospective Data Analysis of pediatrics patients files was done which covered over a period of 6 months. These Pediatrics patients had attended pediatric department in outpatients or through casualty/Emergency. These patients were admitted and later after investigations finally diagnosed as cases of Meningitis or septicemia or as other serious bacterial infections. These patients files were evaluated in the proforma given below and studied for the time of delay in administration of antibiotic since the patient was first seen. **Results:** The results of the study showed that of 23 total patients only 5 patients (22%) had received their first antibiotic dose within 30 minutes and further total 11 patients (48 %) had received the first dose of antibiotic since admission within 60 minutes.It is further noted that 9 patients (39%) had 2 to 3 hours of delay to get the first dose of antibiotic administered since admission and in another 3 patients (13%) had inadvertent delay of around more than 4 to 7 hours in administration of the first dose of antibiotic since admission.It was also seen that the median time of delay for administration of the first dose of antibiotic to a serious bacterial infection child since admission is of 1 hour 48 minutes, which was noted to be still more than 2 hours during day shifts and lesser than an hour in night shifts. **Conclusions:** It was concluded that almost half number of patients (48%) received within first hour while rest had delay from 2 to 7 hours in administering the first dose of antibiotic in all the seriousl sick children. This delay was considered to be because of multifactorial causes from duty shifts, ward transfer of patients, senior reviews, awaited investigation results and shortage of manpower.

KEYWORDS: Delay, First dose, Antibiotic, Serious Bacterial infections, Nice Guidelines.

INTRODUCTION

We all are sure for one fact that the patients suspected of having serious bacterial infections should receive antibiotic therapy as early as possible and there are grounds of concern over the delay in administration of the first dose of antibiotic.[3]

Many studies have been done in adults especially on bacterial meningitis.[5] and the studies have shown the importance of timely use of antibiotic helps the outcome.[6,11] There haven't been many studies in pediatric age group regarding use of antibiotic and its delay in use. The median time from emergency department registration until initiation of antibiotics was 3.0 hours.[7] There have been hypothesis and study based on it that the morbidity of the clinical presentation of bacterial meningitis are significantly associated with the time when the antibiotic administration is started.[9] It has also been studied that delay in starting treatment has affected the cases of bacterial meningitis adversely in terms of outcome of the cases.[10,11] However no specific gold standards are available. In one case in literature has shown that though all standard practices were followed the anitibiotic was administered by 2 hours was sued in the court of law for malpractices.[4] Literature the interval reported between admission and administration of first dose of antibiotic is 2.1 to 8 hours.[7]

So our retrospective data analysis study was done to get an overview in terms of time of delay in administering the first antibiotic dose in pediatric patients who had serious bacterial infections. We hoped that this study may help us know the reasons and we may be able to further help improvement in patient care and possibly frame local guidelines. We looked upon management practices which were thought to be areas of greater importance which could be improved to potentially avoid delays.

The patients notes were also looked upon for PEWS score and Traffic light system, The Pediatric Early Warning (PEW) score system can help nurses assess pediatric patients objectively using vital signs. The scoring system takes into account the child's behavior, as well as cardiovascular and respiratory symptoms. there have been various studies investigating the PEWS to evaluate its usefulness for indoor patients.[2]

This traffic light table should be used in conjunction with the recommendations in the NICE guideline on Feverish illness in children. National Institue for health and care excellence.[1] (NICE) has issued many guidelines in United kingdom which is often used by health care professionals. It has come up with a Traffic light table which has three colour zones, green, amber and red based on parameters of respiration, circulation, colour of the skin and other factors which help healthcare worker identify a seriously sick child marked under red which needs immediate attention as against the amber which needs monitoring, maybe further investigations, while those falling in green zone are pretty safe children with some minor illness.

Thus the aim of our study was mainly to measure the time of delay for administration of the first dose of antibiotic from admission in cases of serious bacterial infections. We also tried to find out the possible reasons for the delay so that we can think for areas for improvement and possibly develop local guidelines for the same in future.

METHODS

Retrospective Data Analysis of Paediatric patients over a period of 6 months attending pediatric department in outpatients or through casualty/Emergency which were diagnosed as cases of Meningitis or septicemia or other serious bacterial infections. These patients data was studied using the proforma given below. The notes were then analysed for the time of delay in administration of the first dose of antibiotic since admission and the factors affecting it were evaluated.

The patients notes were checked for PEWS score.

1. Proforma
2. Name of the Patient:
3. Date of Birth:
4. Sex:
5. Hospital Number:
6. Date and time of Admission:
7. Date of discharge:
8. Duration of Hospital Stay:
9. Presenting Complaints:
10. General examination: Temp: Pulse: Resp: BP O2 Saturation Capillary refill time (CRT).
11. PEWS Score:
12. Traffic Light systems:(NICE GUIDELINES) (to TICK) : GREEN AMBER RED
13. Systemic examination;
14. Provisional Diagnosis:
15. Investigations.
16. Final diagnosis:
17. REVIEW BY SENIOR Consultant DATE/TIME:
18. Management Plan:
19. Date & Time of Antibiotic Prescribed:
20. Name of the Antibiotic Prescribed:
21. Date & Time of first dose of antibiotic Administered:
22. Place where Antibiotic first dose was administered: (TICK): Casualty

Assesment units Pediatric ward Any Other.

RESULTS

1. Total number of patients: 23
2. Sex distribution:

Male 16 (70%)
Females 7 (30%)

3. PEWS SCORE

Out of total number of 23 patients:

11 patients (47 %) had no entry of pews score on their case sheets.

Pews Score was calculated for them too.

Pews score	Above 5	----	3 (13 %)
	2-4	----	14 (60 %)
	Less than 2	----	6 (26 %)

4. Traffic Light System

18 patients were under 5 years of age group.

Nice guidelines were used for under 5years with feverish illnesses to mark them under three traffic light zones Green, Amber & Red.

Green	None	
Amber	13 patients	(72 %)
Red	05 patients	(28%)

3. Observation of Time of Delay from admission to administration of first dose of antibiotic in serious bacterial infections

After going through the retrospective analysis of the 23 patients case sheets,who were diagnosed to be having serious bacterial infection who were admitted and started with the antibiotics.From the records of the notes the date and time when the patient was admitted and further when the patient was shifted to the ward and when the child received the first dose of antibiotic was noted in all the 23 patients.The following were the observations:

It was seen that 5 patients got the dose of first antibiotic within half hour of admission.

11 patients total had got the first dose of antibiotic within an hour after admission.

The delay for the First dose of antibiotic to get administered since admission is as follows:

- In first half hour (30 minutes): 5 patients got the antibiotic first dose.
- In the first hour (60 minutes): another 6 patients were added to the above list.
- In the second hour (120 minutes): another 4 patients added to the above list.
- In the third hour (180 minutes): another 5 patients got the first antibiotic dose.
- In the fourth hours (240 minutes) another 2 patients for the first antibiotic dose.
- After delay of 7 and half hour (450 minutes): one patient for the first antibiotic dose.

Table 1: Total number of patients (N =23) and male and female distribution of patients.

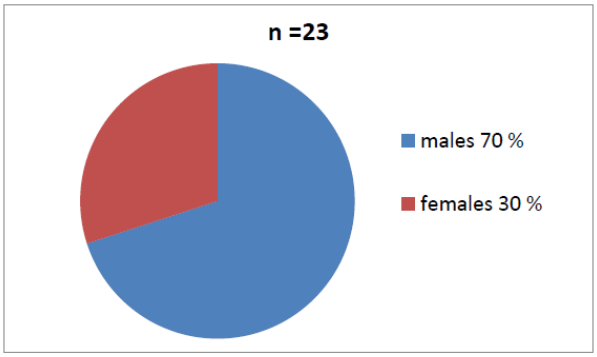
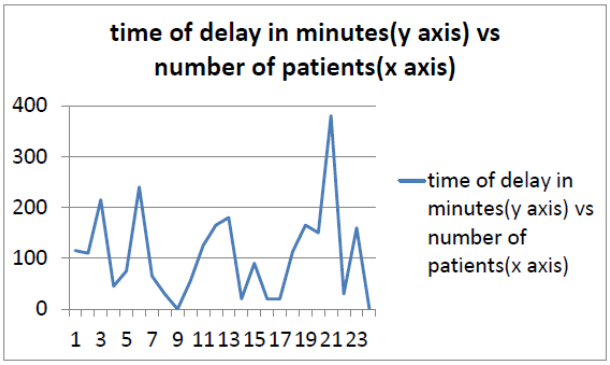


Table 2: Showing time of delay in minutes on Y axis and number of patients on X axis.



From above it could be inferred that only 5 patients our of 23 means 22% patients had revceived their first antibiotic dose within 30 minutes and further total 11 patients means around 48 % patients had received the first dose of antibiotic since admission within 60 minutes.

It is also seen that another 9 patients (39% Patients) needed 2 to 3 hours of delay to get the first dose of antibiotic administered since admission. It was observed that 3 patients (13%) had inadvertent delay in administration of the first dose of antibiotic since admission of around more than 4 to 7 hours.

From above observations it was inferred that the median time of delay for administration of the first dose of antibiotic to a serious bacterial infection child since admission is of 1 hour 48 minutes, which was noted to be still more than 2 hours during day shifts and lesser than an hour in night shifts.

Median time of delay = 1 hour 48 minutes (108 minutes).

Median time of delay (as per diurnal variation):

Day shifts 2 hours 7 minutes (127 minutes).

Night shifts 55 minutes.

DISCUSSION

It is very important for the patients who are suspected to have serious bacterial infections should receive their first dose of antibiotic as soon as possible as per all available literature till now.

Since the patient is first seen in the emergency department the technicalities involved from the patient been first seen by a doctor in the emergency department till the patient gets administered the first dose of antibiotic which was prescribed were studied.

From above results it was observed that only around 22% patients could receive their first dose of antibiotic administered within first half hour, while 48 % of the patients got their antibiotic in first hour since admission. It was also seen that almost 39 % of the patients had an delay of around 2 to 3 hours while in 13% of patient the delay took still longer around 4 to 7 hours to get their first dose of antibiotic administered.

There were multiple factors involved from human factors to nonhuman factors which could result in the delay were studied.

The possible reasons for the delay in administration of the first dose of antibiotic to a patient who has serious bacterial infection could be multifactorial.

1. Duty shifts: The doctors and the nurses work in shift duties and it does happen that during changeover of the shifts there is handover of the doctors and the nurses regarding the patients which may result in the delay.

2. Shift to ward: Most of the times due to busy running Casualty and the emergency department the patient is not administered the drugs till the patient is shifted to the necessary admission ward usually the pediatric ward in our cases. Once the patient is shifted to the pediatric ward there is the handover of the patient from one nurse to the ward nurse who will then check and cross check and then go on to administer the antibiotic. The ward nurses may be also preoccupied with the ward patients and may be the reason for the delay.

3.Senior review: Most of the times the patients are first seen in the causalty or the emergency department by the junior doctor who then needs confirmation by the senior doctor or the consultant in charge for the patient to get go ahead with the orders or any new changes needed to be done. Hence there may be a delay until the senior doctor is informed about the patient and he comes and reviews the patient to get a go ahead to follow the order and get the antibiotic administered.

4. Awaiting bloods results: At times when the clinical findings are not quite supportive of seriously bacterial infections, there is a need to co-relate the patients clinical finding with the laboratory reports which take few hours to be received after being send and when they are strongly supportive of seriously bacterial infection then the dose of antibiotic is administerd.

5. Shortage of doctors and nursing staff: There is always shortage of the doctors and nursing staff which results in the present staff being overburdened with the work and so it happens that there is a delay in the work to be done.

6. Documentaion Errors: There were many documentation errors noted which might have affected the outcome of this study as well and definitely formed the part of shortcoming of this study. This research work did have its shortcomings as it is unique in a way as it seems to have never done before and there is no gold standard for comparison.

We found that the documentation of patients notes had some fallacy. There was no time written when doctor has seen the patient. There was also no time written on the prescription for the antibiotic. Many notes did not have the PEWS score which had to be calculated. None of the notes had Traffic light system guidelines according to NICE guidelines for seriously sick child to differentiate between patients who are fine enough to be treated as out patients and others who need immediate intervention admission and management to be started.

CONCLUSIONS

It can be concluded from our study that there does occur delay in time of administration of the first dose of antibiotic to a seriously sick child for multiple reasons and there is definitely scope for improvement and change to be brough over at many levels.

There is always a scope for improvements and with current scenarios of accredition like the NABH Accredition for hospital many guidelines have been re-written to make safer practices and to avoid errors.

The Drug Charts need to have prescription date and time of prescription and later followed by the time when the drug was administered can be written by the nurse who administers the drug.

Local guidelines should always be made available for antibiotic usage in the hospitals which can highlight the management of various seriously sick children with bacterial infections.

It would be prudent to make use of NICE guidelines for serious bacterial infections, PEWS score, and the traffic light systems to differentiate children who need immediate attention.

It is important for the senior doctors and consultants to review such sick babies as soon as possible to give urgent inputs for further management in the best patient care practices.

The time of delay during shift hours and the transfer of the patients from the emergency department to the wards need to be managed by administering the sicker babies with the treatment and the drugs in the emergency department itself rather than in wards after transfer of patients. The shortage of doctor and nursing staff should be better dealt with the human resources department to fill in appropriate number of the staff that the patient care is least affected.

Thus as regards to the current topic of the delay in administering the first dose of antibiotic to the patient with seriously sick child can be prevented by all above measures.

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