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Restricted versus Prolonged Antibiotic Usage in Gynaecological Practice

Ahmad Ayesha, Batra Swaraj, Jain Reena and Nigam Aruna
Department of Obstetrics and Gynaecology, Hamdard Institute of Medical Sciences and Research, Jamia Hamdard, New Delhi, INDIA

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Abstract

Surgical site infection is one of the most common surgical complications. In the best of circumstances, the incidence is around 5%. It has given rise to irrational use of antibiotics, especially in the context of developing countries. It is this misuse of antibiotics that has paved the way for antibiotic resistance becoming a major global public health problem. To compare antibiotic use, cost and consumption before and after initiation of an antibiotic restriction policy in our hospital. The primary outcome was incidence of infectious complications in women undergoing elective/emergency gynaecological and obstetric procedures. The study was a retrospective analysis, conducted over a period of eight months. In-patient data of antibiotic usage and incidence of infectious complications was collected. The results were compared before and after antibiotic restriction policy was practised. There was no change in infectious morbidity in major obstetrical surgeries, minor gynaecological surgeries and vaginal deliveries. There was decrease in infectious morbidity with respect to major gynaecological surgeries. There was a decrease in the antibiotic consumption, no change in the hospital stay and a decrease in cost of treatment. Indiscriminate use of prophylactic antibiotics is associated with selection of antibiotic resistant bacteria. It may also result in de-stabilisation of the patient's ecosystem and actually hamper the healing process.

Keywords: Antibiotic, prophylactic, gynaecological surgeries.

Introduction

Infection that occurs after surgery in the part of body where the surgery took place is called as surgical site infection [SSI]. An incidence of up to 5% has been reported in patients undergoing any surgical procedure[1]. In an effort to decrease SSI, prophylactic antibiotics have been recommended. The concept of using prophylaxis is elimination of infections in the subclinical stage and prevention of infection that has not yet started[2].

Prophylaxis has been defined as use of antibiotics before, during, or after a diagnostic, therapeutic, or surgical procedure to prevent infectious complications. The duration of prophylactic antibiotic therapy should be single dose except in special circumstances. The antibiotics selected for prophylaxis must cover the expected pathogens for that operative site[2].

However, despite universally accepted recommendations[1,3], prolonged usage of antibiotics is still rampant in India. It is this misuse /or overuse of antibiotics that is instrumental in development of resistant micro organisms.

Significance of the Study: India being the manufacturer of one third of the world's antibiotics and one of the major consumers, the extensive usage of higher antibiotics, especially the carbapenem group in an uncontrolled and unrestricted manner has resulted in carbapenem resistance in the form of NDM-1 in India[4]. There is a misconception that restricted usage of antibiotics is relevant in the context of developed nations. We aim to show by the results of this study that even in India, restriction in antibiotic usage does not have negative impact on the surgical outcome.

Aim of the Study: The present study was conducted to compare antibiotic usage, cost and consumption before and after initiation of an antibiotic restriction policy in our department. The primary outcome was change in incidence of infectious complications in women undergoing elective/emergency gynaecological and obstetric procedures. The secondary outcome was assessment of cost effectiveness of antibiotic usage in women undergoing gynaecological and obstetric procedures.

Material and Methods

The present study was a retrospective analysis carried out at Hamdard Institute of Medical Sciences and Research, Jamia Hamdard. A total number of 1142 subjects over a period of eight months were analysed. The inclusion criteria were women who underwent any minor/ major, obstetrical/ gynaecological procedure at HAH Centenary Hospital. The exclusion criteria were dai handling, chorio-amnionitis, uncontrolled diabetes mellitus, heart disease, immuno-compromised status, any medical co-morbidities and abscess drainage.

The subjects were divided into two groups, I and II. Group I comprised of patients getting prolonged course of antibiotics, prior to antibiotic restriction policy. The typical regimen was 1 pre-operative dose, followed by antibiotics for 5 to 7 days. At

the end of treatment, in major obstetrical and gynaecological surgeries, on an average a patient received five doses of injectable amoxicillin-sulbactam, four doses of gentamicin and seven doses of metronidazole. This was followed by oral amoxicillin-sulbactam and metronidazole for 5 to 7 days. Patients who underwent minor procedures and vaginal deliveries had at least one dose of injectable amoxicillin-sulbactam/ ceftriaxone followed by oral amoxicillin-sulbactam/ cefixime with or without oral metronidazole for 5 to 7 days.

Group II comprised of patients after implementation of antibiotic restriction policy in the department. In this group, antibiotics were not routinely administered to patients of vaginal delivery irrespective of episiotomy, patients with elective dilatation and curettage, medical termination of pregnancy by surgical methods or endometrial biopsy. Patients of incomplete abortion, sterilization, cervical biopsy were given only one pre-operative dose of antibiotic, either oral or injectable. All patients who underwent abdominal/vaginal hysterectomy, Manchester operation, laparatomy, cesarean section were administered 1 pre-operative dose, followed by two doses, total post operative course completing within 24 hours. At the end of treatment, patients received on an average three doses of injectable amoxicillin sulbactam with or without two doses of injectable metronidazole. Patients, who underwent minor surgeries and vaginal delivery, received either no antibiotic or a single oral ciprofloxacin or a single injectable amoxicillin-sulbactam. All antibiotics were started 30 minutes before the procedure.

The patient stay protocol remained the same with the two groups; major surgery cases being discharged on fifth post operative day and minor surgery cases the same day or next day. Vaginal deliveries were discharged after 48 hours. All patients were followed up in OPD after 7 days.

The two groups were assessed for the following surgical procedures, major gynaecological surgery, minor gynaecological surgery [EB, D and C, MTP, cervical biopsy], major obstetrical surgery, vaginal delivery with or without episiotomy.

Data were analysed using chi square test and p value was calculated to determine significance of the findings. As the study was a retrospective analysis, ethical clearance was not required.

Results and Discussion

Table 1 compares the incidence of infectious morbidity between the two study groups with respect to major and minor gynaecological, major obstetrical surgeries and vaginal deliveries. It was observed that with respect to major obstetrical surgeries, vaginal deliveries and minor gynaecological surgeries the results between group I and II were similar. There was no beneficial effect with prolonged usage of antibiotics. However, with respect to major gynaecological surgeries, the infectious morbidity rate was more in group I as compared to Group II. This difference was statistically significant.

Figure 1 demonstrates the cost comparison between the two study groups. There was highly significant difference in the cost of overall treatment between the two groups. The cost effectiveness of antibiotic usage was more in Group II.

The unrestricted usage of antibiotics has long been the topic of discussion amongst the scientific community especially in developed nations. Various guidelines have been formulated by the latter which are being increasingly adhered to. However, this realization is still to be accepted by the developing countries and put into practice. India has only recently woken up to this pandemic after a strain of Carbapenem resistant Klebsiella pneumonia was found to carry a novel gene bearing an enzyme, christened as 'New Delhi Metallo-Beta-lactamase[5].

On the basis of a nationwide survey on antibiotic testing in Indian laboratories, the Government of India in 2011 issued a formal statement accepting that there is an increasing resistance to the commonly used antimicrobials in India[6]. Thus was formulated the National Policy for Containment of Antimicrobial Resistance. Amongst the salient features were usage of the term 'antimicrobial stewardship', proposal for starting training modules to teach rational drug prescription, proposal to ban over the counter sale of antimicrobials, labelling them as schedule H drug, color coding of third generation and newer drugs and curtailing the availability of fixed dose combinations[6]. However the rising awareness of hazards of antimicrobial resistance has not resulted in an alteration of behaviour of medical personnel. Besides increasing the awareness, we need to instil confidence in their minds that usage of lesser antibiotics even in low resource settings does not have deleterious results. This is the main highlight of the present study.

We observed a surprising increase in infectious morbidity with prolonged antibiotic usage and attribute this to probably weakened body's natural resources, change in healing patterns and as yet unknown adverse effects of antibiotics on human organ systems. It is already proven that antibiotics bring about a change in natural flora and alteration of nutrient absorption in intestine. Researches in University of Nevada, Reno have recently demonstrated that tetracyclines reduce male reproductive function and sperm viability up to 25% in male pseudoscorpions[7]. In a landmark discovery, the researchers have proven the effect to be transferred to offspring [transgeneration effect]. This has raised new questions regarding adverse effect profile of antibiotics.

Based on our experience and recommendations from different societies, we recommend antibiotic prophylaxis for hysterectomy, laparatomy, cesarean sections and 3rd/4th degree perineal tear repair. We reiterate that even in Indian context, no antibiotics are required for diagnostic laparoscopy,

hysteroscopy, vaginal delivery [with or without episiotomy/ instrumental delivery] minor procedures such as dilatation and curettage, medical termination of pregnancy, endometrial biopsy, IUD insertion or short term urinary catheterization. The Cochrane Database recommends against prophylactic antibiotics for both short term as well as long term urinary catheterization[8,9].

Table-1
Comparison of Infectious Morbidity

Type of Surgery	Study Group	No. of subjects	Infectious Morbidity					Statistical significance
			Fever	UTI	Wound gape	Any other	Total [%]	p value
Major Gynae surgery	I	64	2	0	3	0	7.81	0.00025
	II	169	0	0	0	0	0	
Minor Gynae surgery	I	130	0	0	0	0	0	0
	II	330	0	0	0	0	0	
Major Obstetric surgery	I	72	0	0	2	0	2.78	0.52
	II	82	0	0	3	0	2.44	
Vaginal delivery +/- episiotomy	I	116	0	0	2	0	1.72	0.32
	II	179	0	0	1	0	0.56	

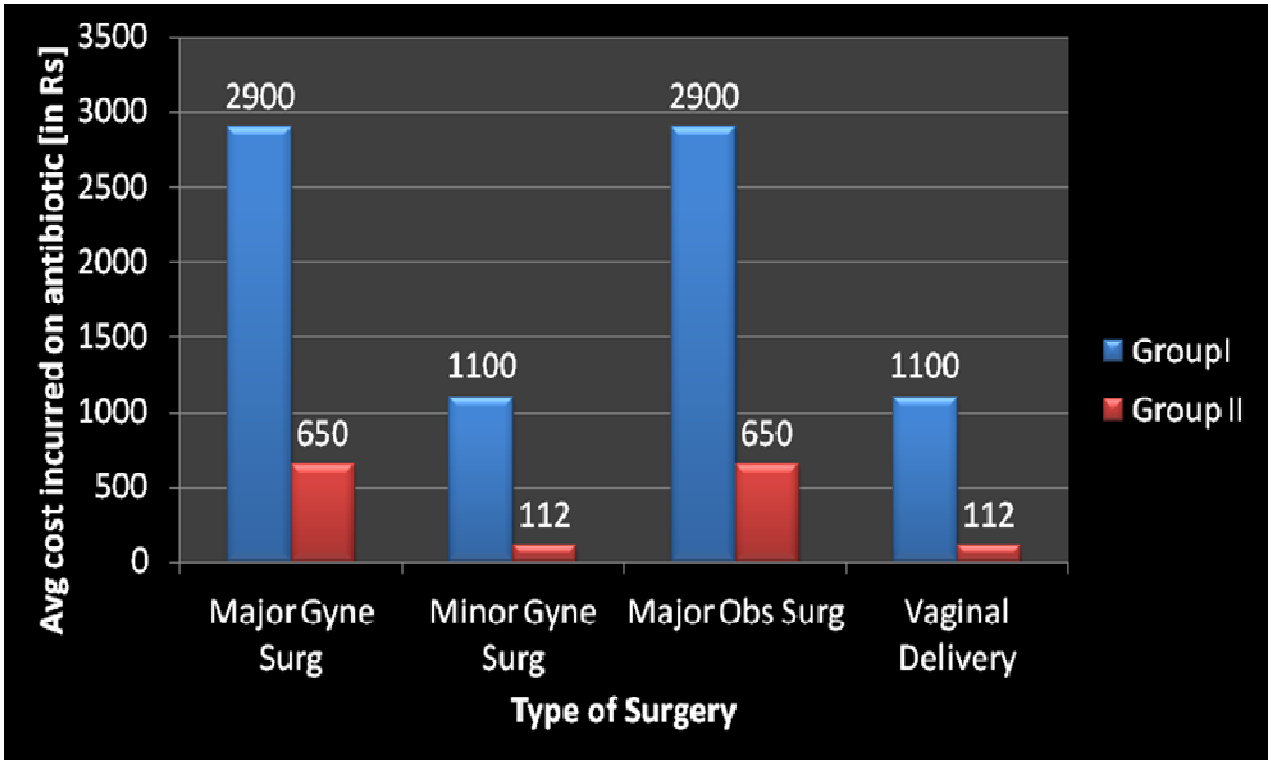

Figure-1
Cost of Therapy: Comparison

Conclusion

Antibiotic restriction policy was effective in decreasing the antibiotic consumption and increasing rational antibiotic prescription in our department. There is a need to educate the public and practitioners in developing countries as is being practiced elsewhere. CDC celebrates November 12th to 18th as "Get Smart about Antibiotics Week" each year[10]. It is time we initiate similar steps and increase awareness regarding appropriate usage of antibiotics.

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