Evaluation of Antibiotic Prophylaxis in Abdominal Hysterectomy

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Summary

A prospective randomized comparative study was conducted in the patients undergoing abdominal hysterectomy to compare postoperative morbidity with prophylactic ampicillin & a combination of ciprofloxacin and metronidazole. Ampicillin was given in 3 doses, 2 gm I/M along with premedication followed by 2 more doses of 1 gram each 6 hrs apart (Group I). Group II received single dose of ciprofloxacin 200mg I/V + 500 mg metronidazole 1/V at the time of induction of anaesthesia. Postoperative morbidity in terms of febrile morbidity, urinary tract infection, vaginal cuff infection, abdominal wound infection, pelvic cellulitis, additional antibiotics and hospital stay was compared in the two groups.

Overall postoperative morbidity was 65% in patients receiving 3 doses of ampicillin as compared to 35% in those receiving a combination of ciprofloxacin & metronidazole (P<0.001). Similarly febrile morbidity of urinary tract infection was significantly reduced in group II. However, the difference in vaginal cuff infection, abdominal wound infection, hospital stay & additional antibiotics was not significant statistically.

Introduction

Hysterectomy is one of the most frequently performed operations. Though mortality due to this common surgery is very low, postoperative morbidity may be as high as 30% (Cecilia et al, 1986). This takes the form of abdominal would infection, vaginal cuff infection, pelvic cellulitis or pelvic abscess. A beneficial effect of prophylaxis is not as evident in abdominal hysterectomy as it is in vaginal hysterectomy. Since there are not many studies in the past showing the role of antibiotic prophylaxis in reducing the incidence of pelvic cellulitus after abdominal hysterectomy, we comtemplated the present study to find out an optimally effective prophylactic regimen of this operation to reduce antimicrobial usage & cost. As we had been using a standard regimen of ampicillin prophylactically in cases of abdominal hysterectomies and expect that many organisms would have developed resistance to it, a combination of ciprofloxacin and metronidazole was selected as the antibiotic prophylaxis for this study.

Materials & Methods

This prospective randomized comparative study was conducted in the department of obstetrics and gynaecology along with the department of pharmacology at Jawaharlal Nehru Institute of Postgraduate Medical Education & Research, Pondicherry from April 1994 to August, 1995. The subjects included in the study were all women undergoing abdominal hysterectomy below 50 years of age. All those women who had oral temperature of 38°C (100.4° F) or those who had received antibiotics upto 40 hours before surgery were excluded from the study. Other exclusion criteria were known or suspected renal function impairment as manifested by

more than 50 mg of blood urea, haemoglobin less than 10 gm.dl, gynaecological malignancy or chronic medical illness.

The patients were allocated randomly to one of the two groups – Group I received 2 gm of ampicillin along with premedication followed by 2 more doses (1 gm/6 hourly). Group II received ciprofloxacin (200 mg I/V) and metronidazole (500mg IV) at the time of induction of anaesthesia. All patients were kept on continuous bladder drainage for about 24 hours & both the groups were observed for signs of infection till the sutures were removed. The basis for assessment were febrile morbidity, pelvic cellulitis, vaginal cuff abscess, urinary tract infection, abdominal wound infection, need for additional antibiotics and duration of hospitalization.

All relevant information was entered into a predesigned proforma and the data collected was analysed assessing the statistical significance using Standard Error of difference between two proportions.

Results

The patient characteristics of Group I & II comprising of 40 patients each are shown in Table –I.

Most of patients received general anaesthesia or spinal anaesthesia, and 62.5 and 75% of the surgery in Group I & II respectively was done by consultants. The most common indication of hysterectomy was fibroid uterus in both the groups. Other indications were DUB, CIN and endometriosis. There was no significant difference between the operating time in the two groups.

Febrile morbidity (Table II) was significantly high in Group I as compared to Group II ($P<0.01$), and total morbidity in Group I was also much higher. ($P<0.01$).

There was no statistically significant difference between the number of patients who required additional antibiotics in post operative period and in the duration of hospital stay between the two groups.

Table I
Patient Characteristics

Group	No. of Patients	Mean age (years)	Mean weight (kg.)	Mean Hb (%)	Mean Blood Sugar (mg %)	Mean Blood (mg %)
I (Ampicillin)	40	40.1	47.3	10.5	80	20
II Ciprofloxacin + Metronidazole	40	42.8	48.3	10	84	20

Table II
Postoperative morbidity

Group	Febrile Morbidity		UTI		Vault infection		Wound infection		Total morbidity	
I	No.	%	No	%	No.	%	No	%	No.	%
	19	47.5	15	37.5	11	27.5	10	25	26	65
II	10	25	6	15	6	15	7	17.5	14	35

Table III
Result of Post Operative Cultures

Group	Urine Culture		Vault Culture	
	Positive	Resistant	Positive	Resistant
Ampicillin	9/40 (22.5%)	5/40 (12.5%)	11/40 (27.5%)	4/11 (36.3%)
Ciprofloxacin Metronidzole	2/40 (5%)	1/40 (2.5%)	6/40 (15%)	1/6 (16.6%)

The results of postoperative urine culture showed that the organisms were resistant to ampicillin in Group I in 12.5% of cases as compared to 2.5% in Group II. Similarly, there were 36.3% resistant organisms in vault cultures in group I as compared to only 16.6% in group II (Table III).

Discussion

The value of prophylactic antibiotics in preventing operative site infection following vaginal hysterectomy is well established. However, its role in abdominal hysterectomy is much less clearly defined. In fact it can be agreed that irrational use of antibiotics may be harmful by exerting unfavourable selective pressure on the microbiologic flora and causing untoward side effects in selected individuals.

Different studies have shown beneficial effects in reducing postoperative morbidity by antibiotic prophylaxis. Allen et al (1972) in a prospective study found a decrease in postoperative morbidity from 41% in women receiving placebo, to 14.1% in women receiving prophylactic cephalothin. This is comparable to the results in the present study; however the high morbidity in our patients (65% & 35% in in Group I & II respectively) may be due to poor socioeconomic status and malnutrition. Similarly, Roberts and Homesley (1978), in their double blind prospective study have reported a profound reduction in febrile morbidity from 54.1% to 4% by giving prophylactic carbenicillin preoperatively.

Allen et al (1972) and Ohm and Galask (1976), however felt that febrile morbidity is not an accurate measure of treatment outcome, because not all patients with febrile morbidity have overt clinical infections. Duff and Keiser (1982) in their series, showed that 62% of patients with febrile morbidity actually had clinical infections requiring treatment with antibiotics. The test of a prophylactic regimen should be its ability to reduce the number of overt infections, not its ability to decrease the number of patients who meet a standard definition of febrile morbidity. A high incidence of febrile morbidity in the present study seems to be due to organisms resistant to ampicillin in Group I.

Polk et al (1980), in a randomized placebo controlled trial found a significant reduction in UTI from 21% to 9% among women who received cefazolin prophylactically as compared to those who received placebo. We also found statistically significant difference in the incidence of urinary tract infection in two groups (37.5% vs 15%). On the other hand. Duff and Park (1980) opined that the antibiotic prophylaxis does not consistently reduce the incidence of UTI. However, Poulsen et al (1983) studied the efficacy of a two dose pre-operative course of oral metronidazole and showed a significant reduction of UTI from 30% to 10%.

The incidence of vaginal cuff infection in Group I who received only ampicillin was much higher than in Group II, though not significant statistically. Ohm and Galask (1976) and Grossman et al (1979) also noted an increased growth of E.coli in the postoperative vaginal vault cultures.

Surgery of the genital tract results in a portal of entry for invasive organisms already present, but may also increase the prevalence of organisms commonly involved in infectious processes so that risk of sepsis may be even greater than previously recognized and involved mechanisms previously known (Lasen and Galask, 1980).

A significant reduction in the abdominal wound infection can also be brought by prophylactic antibiotics as has been shown by Allen et al (1972). Abdominal wound infection in the present study was much higher (25%) in Group I than in Group II (17.5%) but it was not a significant reduction.

Two studies (Allen et al, 1972 and Polk et al, 1980) specifically showed a reduced hospitalization of patients receiving antibiotic prophylaxis. But in the present study there was no difference in duration of hospital stay in both groups, though the overall morbidity in Group I was higher. The reason may be that the patients were from district rural areas and even those who were well were reluctant to go home.

Conclusion

The use of Ciprofloxacin combined with metronidazole at the time of induction of anaesthesia significantly reduces postoperative morbidity in abdominal hysterectomy.

References

1. Allen JL, Rampone JF, Wheeless CR. Am J Obst Gyn 39:219, 1972.
2. Cecilia C. Senior, Steigrad Stephen J., Am. J. Obst. Gyn. 154 (5), 1004, 1986.
3. Duff P, Park R. Obstet Gynecol 55: 1935, 1980.
4. Duff P, Keiser JE. Am J Obst Gyn 142: 996, 1982
5. Grossman JH III, Graeco TP, Minkin JJ Adams RI, Hierhalzer Wg for Andriole VT; Am J Obst Gyn 53: 537, 1979.
6. Lasen B, Glask RP. Obstet Gynecol 55: 100, 1980.
7. Ohm MJ, Galaxk RP. Bacteril flora of the cervix from 100 prehysterectomy patients. Am J obstet Gynaecol 122: 683, 1976.
8. Polk BF, Shapiro M Goldstein P, Tager IB, Goren White B, Schoerbaum SC; Lancet I: 437, 1980.
9. Poulsen HK, Borel J, Olsen H. Obstet Gynecol 63: 291, 1983.
10. Roberts JM, Homesley HD. Obstet Gynecol 52: 83, 1978.