Early Outcome of Postoperative Pyrexia Following Major Surgery in Mulago Hospital

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Background: This study was undertaken with the main objectives of determining the incidence, the associated factors and the early outcome of postoperative pyrexia and documenting the use of perioperative antibiotic therapy in the elective major surgical patient.

Methods: This was a 5months prospective study carried out in the surgical wards of Mulago Hospital in Uganda. The study variables including socio-demographic characteristics, type of surgery, surgical approach and procedure, operative diagnosis, use of antibiotics, operative wound, and usage of drains, blood transfusion and preoperative stay were recorded in 168 patients undergoing elective major surgery. Six hourly body temperatures were recorded and all patients were daily reviewed for infections and malaria. Laboratory investigations were clinically oriented.

Results: Postoperative pyrexia occurred in 13.7% of patients undergoing elective major surgery. Malignancy, intestinal resection and anastomosis, urinary catheterization, nasogastric tube, intraoperative blood transfusion and prophylactic antibiotics were significantly associated with postoperative pyrexia ($p<0.05$). Surgical site infection, chest infection, urinary tract infection and malaria were the major causes of postoperative pyrexia. Prophylactic antibiotics were used in 16.7% of the patients whereas liberal postoperative antibiotic prescription was done in 93.5% for an average duration of 5 days. Postoperative pyrexia significantly increased the length of hospital stay ($p=0.016$).

Conclusion: Infections and malaria are important causes of postoperative pyrexia. All pyrexial patients should be investigated for malaria. There is a need for a policy regarding the use of perioperative antibiotics in Mulago hospital.

Introduction

Postoperative pyrexia is common after major surgery. It generates additional workup, antibiotic therapy and prolongs hospital stay. All these are expensive and carry the risk of additional morbidity. Though postoperative pyrexia is associated with infectious and non-infectious causes, infection seems to be the major concern to the surgeon[1,2]. In endemic regions, malaria is also a cause of postoperative pyrexia [2,3,4].

For several decades, prophylactic antibiotics have been known to reduce the occurrence of postoperative pyrexia associated with major surgery[5]. However, because of the fear of infection, many surgeons use antibiotics and sometimes in an irrational fashion[6]. Malaria prophylaxis has been advocated in a number of countries to reduce the incidence of postoperative pyrexia[1,3,4]. This study was aimed at determining the incidence, the associated factors and the early outcome of postoperative pyrexia and documenting the use of perioperative antibiotic therapy after elective major surgery at Mulago hospital.

Patients and Methods

This prospective study was undertaken from October 2005 to February 2006 and included afebrile ($T^o \leq 37\ ^oC$) patients aged 5years and above who had been scheduled for elective major surgery. Patients on antimalarial drugs or corticosteroids and those who became unconscious postoperatively were excluded from the study. Postoperative pyrexia was defined as temperature $\geq 38^oC$ on two consecutive occasions excluding the first 24hours.

From the day of operations, patients were followed up for 10 days or until discharge or death in hospital if this occurred before ten days. During the follow up, patients had six hourly body temperature charts. The day of onset and the duration of postoperative pyrexia were recorded. Temperature resolution was defined as temperature $< 38^oC$ for at least 72 consecutive hours. Socio-demographic characteristics, preoperative stay, type of surgery, surgical procedure, class of operative wound, drains, malignancy, blood transfusion, prophylactic and postoperative antibiotics were investigated for association with postoperative pyrexia.

All the 168 patients included in the study were studied by daily screening for SSI, chest infection, UTI, malaria and any other infection.
Data was analyzed with SPSS version 11.0 and Epi Info 2002. Categorical variables were tested for association with the chi-square, Fischer's exact tests and relative risks. Continuous variables were tested using the independent t-test for the differences in the means. A p-value of < 0.05 was considered significant.

Results

A total of 168 patients were enrolled in the study. The age ranged between 5 and 82 years with a mean (±SD) of 41.25 (±18.99) years. There were 90(53.6%) males and 78(46.4%) females. The M: F sex ratio was 1.15:1. Other patients' characteristics are shown in Table 1.

Postoperative pyrexia

Out of 168 patients, 43(25.6%) patients became febrile during the postoperative period. However, only 23(13.7%) patients met the criteria for postoperative pyrexia. The mean (±SD) day of onset of postoperative pyrexia was 3.5(±2.01) postoperative day.

Factors associated with postoperative pyrexia

The factors associated with postoperative pyrexia are shown in Table 2.
After regression analysis, only the diagnosis of abdominal lymphoma, the operation of intestinal resection & anastomosis and the use of prophylactic antibiotics were independently associated with postoperative pyrexia.

Causes of postoperative pyrexia

The causes of postoperative pyrexia are shown in Table 3. Among the infectious complications, surgical site infection (SSI) occurred in (18/168) 10.7% of the patients.

Table 1: Distribution of patients' characteristics

Patients' Characteristics	Frequency	Percentage
Preoperative Stay < 3 Days	36	21.4
Preoperative Stay >15 Days	51	30.4
Clean Wounds	68	39.9
Clean-Contaminated wounds	101	60.1
Malignancy	63	37.5
Urinary catheter	16	9.5
Drain	54	32.1
Nasogastric tube	4	8.4
Feeding gastrostomy	18	10.7
Blood transfusion	14	8.4
Prophylactic antibiotics	28	16.7
Postoperative antibiotics	157	93.5

Table 2. Factors associated with postoperative pyrexia.

Patient characteristics	Postoperative Pyrexia (N=23)	No Postoperative Pyrexia (N=145)	p-value	RR [95%C.I.]
Intestinal R & A	5(21.7%)	0(0.0%)	0.000	9.06[5.86 – 14.00]
Laparotomy + Excisional biopsy of Lymph Node	3(13.0%)	2(1.4%)	0.018	4.89[2.14 – 11.16]
Colorectal cancer	6(26.1%)	2(1.4%)	0.000	7.06[3.87 – 12.88]
Abdominal lymphomas	3(13.0%)	0(0.0%)	0.002	8.25[5.47 – 12.44]
Urinary catheter	6(26.1%)	16(11.0%)	0.004	4.76[1.54 –14.76]
Blood Transfusion	5(21.7%)	9(6.2%)	0.012	4.20 [1.27 – 13.92]
Naso-gastric tube	3(13.0%)	1(0.7%)	0.000	21.6[2.14– 217.82]
Prophylactic Antibiotics	10(43.5%)	18(12.4%)	0.000	5.43 [2.08 – 14.19]

Table 3. Causes of postoperative pyrexia

Cause	Frequency	Percentage
Infectious cause	8	34.4
Malaria	6	26.1
Multifactorial	5	21.7
Unknown cause	4	17.4
Total	23	100

Table 4. Postoperative Pyrexia vs Early Outcome.

Outcome	Postoperative pyrexia		p-value
	Yes	No	
Mean (± SD) length of hospital stay	24.69(±20.56)	12.74(±12.84)	0.016
Died	2(8.7%)	3(2.1%)	0.08
Discharged	13(56.5%)	105(72.4%)	NS
Still in the ward	8(34.8%)	37(25.5%)	NS

SSI had a relative risk of 4.4 [95% C.I. 1.86 – 10.43] for developing postoperative pyrexia (p=0.001). Six percent (10/168) of the patients had a chest infection. Four patients who had chest infection had also postoperative pyrexia. Chest infection had a relative risk of 3.3 [95% C.I. 1.40 – 7.93] for developing postoperative pyrexia (p=0.013). Fourteen (8.3%) patients had positive malaria parasitaemia. Eleven patients who had positive blood smears for malaria parasites had postoperative pyrexia as well. Malaria parasitaemia had a relative risk of 10.08 [95% C.I. 5.49 – 18.53] for developing postoperative pyrexia.

Outcome of postoperative pyrexia

The early outcome of postoperative pyrexia is shown in Table 4. The mean length of hospital stay for patients who developed postoperative pyrexia was significantly different from the mean hospital stay for patients who did not (p=0.016). Postoperative pyrexia did not significantly increase the risk of death in the study (p=0.08).

Discussion

Incidence of postoperative pyrexia

Forty-three (25.6%) patients had a temperature that increased to ≥ 38ºC on at least one occasion; however according to our definition, only twenty-three (13.7%) patients developed postoperative pyrexia in this study. Published incidence rates of postoperative pyrexia vary widely depending on how fever is defined and the study population[6]. The frequency of postoperative pyrexia was on the low side as compared with reports from African studies [1,2,3,7]. The study population of only elective cases may explain this difference. These findings were close to Vermeulen's in his study including elective surgical patients[8].

Factors associated with postoperative pyrexia

Like in many other studies, the age and the gender of the patients were not associated with postoperative pyrexia [2,5,9,10,11].

Blood transfusion was significantly associated with postoperative pyrexia in this study. Kennedy et al [11] reported that the risk of becoming significantly febrile increased fourfold for each unit of blood transfusion. Not only blood transfusion can cause pyrexia shortly after initiating transfusion but also pyrexia may be a manifestation of a delayed hemolytic reaction[12]. Urinary catheterization was significantly associated with postoperative pyrexia in this study. Similar findings were well documented in literature [1,13,14].

Naso-gastric tubes were associated with postoperative pyrexia. It was reported that patients who underwent nasogastric intubations for long periods of time were prone to develop nosocomial sinusitis [15,16]. Prophylactic antibiotics were associated with postoperative pyrexia in this study and this was in agreement with other studies [9,14]. The use of preoperative antibiotic prophylaxis implies contamination or potential operative contamination[14]. Other factors associated with postoperative pyrexia in this study were intestinal R & A, colo-rectal

cancer, abdominal lymphoma. Though no available literature reports about such associations, many authors agree that malignancy and bowel surgery place patients at greater risk of infection [17,18]. Therefore one should have a lower threshold for a further workup when such patients develop postoperative pyrexia.

Causes of postoperative pyrexia

Surgical Site Infection (SSI), chest infection, urinary tract infection (UTI) and malaria were the common causes of postoperative pyrexia. The association between SSI and postoperative pyrexia has been reported in many other studies [1,2,8,9,13]. The SSI rate of 10.1% in this study was not different from that reported in African literature[5,8].

The association between chest infection and postoperative pyrexia is also well documented in many studies [1,2,9]. The chest infection rate of 6% (10/168) in this study was not very far from 7.3%, the rate of chest infection in Khartoum[1].Urinary tract infection was not commonplace in this study and this may be explained by the fact that urinary catheters were not kept for long durations postoperatively. The duration of catheterization is the most important risk factor for the development of nosocomial cystitis or pyelonephritis [14,19].

Other infections were rarely encountered (1.8%). The relatively small number of patients studied may explain this. Eleven (6.5%) patients developed overt malaria postoperatively. This was in line with other studies done in malaria endemic regions [1,2,3,4,7,20]. There were patients who had malaria parasitaemia but who did not have postoperative pyrexia. This demonstrated the endemicity of malaria in this region. Ohanaka[20] suggested that the stress of surgery might facilitate the movement of parasites from the deep tissues to the blood stream.

Since the causes of postoperative pyrexia may be multifactorial (infection and malaria), it is useful to investigate all postoperative pyrexial patients for malaria. One might keep in mind that the cause of pyrexia may remain obscure in spite of investigations [21,22]. Other possible causes to look for may include dehydration, influence of drugs, and absorption of pyogenes from liquefying haematoma or part of the body's response to trauma[1].

Perioperative antibiotics

Antibiotic prophylaxis was used in 16.7% (28/168) of the patients undergoing surgery. It is known that the use of antibiotic prophylaxis can reduce the rate of infections, particularly wound infections after high-risk operations. That 101 (60.1%) operative wounds in this study were clean-contaminated implied a substantial risk of infection developing in the postoperative period. There was a good indication for antibiotic prophylaxis. It is also known that antibiotics administered to patients undergoing clean operations are ineffective [23]. This study revealed that the principles of surgical antibiotic prophylaxis were not respected: 129 patients who were not given any antibiotics before the surgeon could make the incision, were started on antibiotics when they were back in their respective wards. Such antibiotics have been shown to be ineffective; they only lead to the emergence of resistant organisms[6,16].

Outcome of postoperative pyrexia

Postoperative pyrexia significantly increased the length of hospital stay in the study (p=0.016). Shulkin et al [24] found that postoperative fever increased hospital and health care cost, ascribed to extra cost of carrying out microbiology test, radiological services, pharmaceutical costs and extra room costs due to extended hospital stay.
Though postoperative pyrexia did not significantly increase the risk of death in this study (p=0.08) probably, because of the relatively small number of the study population, it was worthwhile noting that (2/23) 8.7% of the patient s who developed postoperative pyrexia died.

Conclusions

- Postoperative infectious complications (SSI, Chest infection, UTI) and malaria are important causes of postoperative pyrexia.
- It is very important to investigate all postoperative pyrexial patients for malaria.
- Judiciously used surgical antibiotic prophylaxis can prevent the occurrence of SSI and postoperative pyrexia.
- There is a need for a policy regarding the use of perioperative antibiotics in Mulago hospital.

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