



## Evaluation of Postoperative Fever in General Surgery Patients in Rajah Muthiah Medical College and Hospital, Chidambaram, Cuddalore, India

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### Abstract

**Background:** *Post operative fever is a common complication seen in the postoperative ward. Most of the cases of pyrexia following surgery are self limiting. The appearance of postoperative fever is not limited to specific types of surgery. Fever can occur immediately after surgery or may occur several days following surgery depending in the underlying cause which might be directly related to surgery or due to infection elsewhere in the body. Therefore, while evaluating for postoperative pyrexia, it is vital to recognize when work up is needed and when immediate intervention is needed.*

**Methods:** *The study on evaluation of post operative pyrexia is based on 110 patients admitted in Rajah Muthiah Medical College Hospital in Chidambaram during the period from November 2018 to September 2019, and who underwent surgery for various surgical conditions. The study includes 45 females and 65 males, all under the age group of 10 to 70 years.*

**Result:** *Between the study period, a total of 1300 major elective surgeries were performed at our hospital. Only 110 patients developed pyrexia in the postoperative period. Of the total number of patients (110) who developed pyrexia, 65 patients were males and the remaining 45 were female.*

**Conclusion:** *In the first 48 hours after surgery, postoperative fever is a common occurrence and the etiology can be difficult to establish in certain clinical situations. This causes great diagnostic dilemma to the surgeon. The occurrence of pyrexia in the postoperative period is not determined by age and sex of the patient. The presence of preoperative co morbidity determines the complication rate and delay in recovery from the fever.*

**Keywords:** *elective surgery, postoperative period, surgical site infection, sepsis.*

### Introduction

Any negative outcomes following surgery is considered as postoperative complication. Fever is

a disorder of the hypothalamic thermoregulation.

Nearly 40% of the patient undergoing major surgery may develop fever and it might be due to

infectious or non infectious causes. It may be an early sign of potentially fatal problem, as in intra abdominal sepsis or it can be a result of a benign process as in atelectasis or drug induced hyperthermia. A core body temperature of 37% (98.6%) is considered to be normal with an expected diurnal variation of approximately 0.8% (1.4%). Fever is caused by the release of cytokines from various inflammatory cells in our immune system and it includes IL-6, IL-1, INF gamma and tumor necrosis factor. IL-6 is the cytokine that is closely associated with postoperative fever.

Most of the cases of postoperative fever are self limiting, however it is essential to recognize the minority of patients that demands immediate attention. A thorough physical examination and proper history is always essential, and appropriate investigations to identify the cause.

The aim and objective of the present study were

- To study the common causes of postoperative fever following major elective surgery
- To study the correlation between the day of onset of fever and its cause
- To study the associated risk factors of post operative pyrexia
- To analyze treatment modalities that are available

**Method**

Preoperative comorbidities like diabetes mellitus, COPD, hypertension, obesity, coronary artery disease of all the patients under the study was done. Intraoperative complications if encountered was noted for every patient. The day of onset of fever, the nature of fever and the temperature in fahrenheit has been noted. Early mobilization was done for all patients to prevent thrombosis of deep veins of lower limb, active breathing exercises were followed to prevent respiratory complications (bronchopneumonia, atelectasis) leading to fever. Investigations to identify the particular causes were carried out.

Pus culture were taken from the surgical site when it was infected. And appropriate antibiotics we

given based in the sensitivity. Respiratory pathology that leads to fever in the postoperative period were identified by clinical examination, radiography of chest and sputum culture done if needed. Catheter tips, intra venous cannula tips were also sent for culture and sensitivity study when necessary surgical site infections were managed accordingly.

**Drain tubes**

Subcutaneous suction drains were used in 40 patients and they were compared with the patients in whom no drain tubes were used.

**Incidence**

Incidence of post operative fever spans between 14 % to 90 % based on various studies, depending on the population that was studied.

**Table-1:** Distribution of causes among different surgery

Patient group studied	Source of infection	Incidence
Major abdominal surgeries	Present	33%
	Absent	48%
Laprosopic cholecystectomy	Present	46%
	Absent	18%
Other general surgical procedures	Present	37%
	Absent	9%

**Inclusion Criteria**

All elective major general surgical procedures performed in patients between the age of 10 to 70.

**Exclusion Criteria**

Patients with known septic focus such as peritonitis, appendicitis, strangulated hernias. Patients with immunodeficiency

**Results**

**Incidence of post operative fever**

During the study period, a total of 1300 major elective general surgical procedures were performed and among the population only 110 patients developed postoperative fever.

**Table-2:** Distribution of postoperative fever

Pyrexia	No of patients	Percentage
Present	110	9.2%
Absent	1190	90.8%

**Age and sex distribution of patients with postoperative fever**

Among 110 patients who had fever, 65 were male and 45 were female. Patients who were younger than 35 years were 32 patients, 51 patients belonged to 35- 50 years of age, 27 were above the age of 50 years.

**Distribution of co morbidity**

The commonest associated co morbidity is diabetes mellitus (32%) followed by obesity (25%). Majority of the studied population had only one co morbidity (39%) and there was 5 patients with more than 3 comorbidities.

**Distribution of day of onset of postoperative fever**

The study revealed that most of the cases developed fever during the first day following surgery (65%). 24 patients developed fever in the second postoperative day. In patients 6 patients, fever occurred after the first five days.

The table below depicts the frequency of occurrence of fever on different post operative days

**Table-3:** Distribution of day of onset of postoperative fever

Day of pyrexia	Number of patients	Percentage
Day 1	71	65%
Day 2	24	21.8%
Day 3	2	1.8%
Day 4	4	3.6%
Day 5	3	2.7%
Day 6	3	2.7%
Day 7	3	2.7%

**Table 4:** Temperature Distribution

Postoperative day	Maximum temperature	Minimum temperature	Mean temperature
Day 1	102	100	101
Day 2	102	100	101
Day 3	103	100	101.5
Day 4	101	100	100.5
Day 5	102	100	101
Day 6	102	100	101
Day 7	101	100	100.5

**Distribution of type of Pyrexia**

The most common type of fever noted was intermittent (97.2%) and only one had a continuous fever.

**Distributionm of Pyrexia with Intraoperative Problems**

The intra operative problems include excessive tissue handling, excessive bleeding, intraoperative hypotension , there was a noticeable increase in the incidence of purecia whenever difficulties were encountered during surgery.

**Distribution of Etiology of Pyrexia**

The commonest cause was found to be surgical site infection (37%) and seroma being the second commonest cause (27%).

**Table-5:** Temperature Distribution

Etiology	Number of patients	Percentage
Infection.	40	37%
Seroma	29	27%
Tissue damage	13	11.8%
Urinary tract infection	6	5.4%
Intravenous catheter line infection	4	3.6%
hematoma	3	2%

**Pathogen Profile in Postoperative Patients With Fever**

The pathogen profile based on the culture report obtained from various samples were collected and the results were correlated to the occurrence of post operative pyrexia. E. coli was the commonest pathogen that was grown on culturing (43%).

**Table 6:** Pathogen profile in postoperative patients with fever

Pathogen	Number of cases in which it was indentified	Percentage
E. coli	21	43.7
Klebsiella	6	12.6
Proteus	7	14.6
Pseudomonas	5	10.4
Streptococcus	1	2.1
Staphylococcus	3	6.2
No Growth	5	10.4

**Discussion**

The analysis of data obtained from 110 patient who had postoperative fever following major

general surgical procedure during the study period is discussed. The association between different variables and the occurrence of fever in postoperative patients are discussed below.

### **Age and Sex Distribution**

The statistical analysis of the data obtained revealed that age and sex of the patient do not have any significant contribution to the incidence of fever during the post operative period and the outcome after the fever subsided. 32 patients were below the age of 35, 51 patients belonged to 35-50 years of age, 27 patients were above the age of 50 years.

### **Distribution of co morbid condition**

The effect of co morbid conditions that the patients had were compared to the various causes of fever in the post operative period. It revealed that presence and the number of co morbid conditions (Diabetes, hypertension, coronary artery disease, bronchial asthma, obesity, COPD) that the patient had was directly proportional to the complication rate and the delay in recovery from the

If only one of the co morbid condition was present then the incidence of complications was more and the day analysis was statistically significant. When the outcomes were compared to the presence of co morbidity, it was found that these co morbidity contributed significantly to the incidence of postoperative fever.

The P value was  $<0.01^{**}$ , it is statistically significant at 1% level. The study also revealed that the presence of co morbid conditions lead to incidence of pyrexia more on post op days 3, 5, 6 and 7<sup>th</sup> days and was statistically significant. The P value for day 3 is  $<0.01^{**}$  and  $<0.05^*$  on 5<sup>th</sup> and 6<sup>th</sup> day

### **Distribution of fever with the time taken of surgery**

The study revealed significant correlation between the duration of surgery and the day on which the fever occurs and it was found that the fever

occurring on day 3 ( $P<0.01^{**}$ ), day 5 ( $P<0.01^{**}$ ), day 6 ( $P<0.01^{**}$ ) and day 7 ( $P<0.01^{**}$ ) were significantly associated to the time taken for surgery.

The more the time taken for completing the procedure, the more was the magnitude of fever. This was owing to higher incidence of tissue damage and seroma formation ( $P<0.01^{**}$ ). Other studies that were made on the levels of IL-6 and the duration of surgical procedure revealed IL-6 levels were significantly raised during longer procedures and hence higher incidence of fever. The occurrence of fever in post operative patients were significantly related to the duration of surgery ( $P<0.05^*$ )

### **Distribution of type of pyrexia**

The type of fever and the recovery of the patients were co related and it was found to be statistically significant ( $P<0.01^{**}$ ). Patients with intermittent nature of fever had earlier recovery while those with continuous fever had delayed recovery and medical complications.

### **Distribution of days of onset of fever**

#### **Fever on days 1-2**

On the first two days following major general surgical procedure, the commonest cause of fever was mainly due to local wound complications. It includes, seroma formation, hematoma, tissue injury during surgery. Infections were noted to cause fever during the first two days but it is comparatively less than the occurrence on the following days after surgery. An article by James et al (2006), in most cases of fever during the first 2 days there were no clearly defined infections and resolved without intervention. Other causes include pulmonary atelectasis, surgical site infections and thrombophlebitis of superficial veins following IV cannulations. These etiologies are not significant statistically.

#### **Fever on days 3-5**

During the postoperative days 3 to 5 the common cause of fever was found to be surgical site infections, sepsis from other sites like IV cannula, drain site, pelvic or sub diaphragmatic collection.

Other causes that were noted during this period include urinary tract infection following catheterization and bronchopneumonia. The data are similar to the previous studies that are available.

### **Fever on day 6-7**

The common cause of fever during the postoperative day 6 and 7 is thrombosis of the deep veins of the lower limb and pelvis. The population studied during the study period were mobilized early following surgery, hence none of them developed deep vein thrombosis. Instead the study revealed wounds complication and infections to be the common cause during day 6 and 7 following surgery.

### **Treatment and outcome**

The population studied (110) were managed either by conservative measure or surgical interventions. Patients with mild fever were managed with antipyretics per orally and those with high grade fever were given IV antipyretics and appropriate antibiotics based on the cause identified. Wound complications like abscess, seroma, hematoma were managed surgically by letting it out and secondary suturing following adequate healing. No mortality was encountered during the study.

### **Conclusion**

Fever during the first days following surgery was more common, and it poses a great difficulty in diagnosing the cause. The pre operative co morbid status of the patient has a direct relation to the complication rate and delay in recovery from the fever. More the number of co morbidities simultaneously present more is the complication rate

Longer surgeries are associated with greater amount of tissue handling and damage and leads to wound complications. It also relates to the delay in recovery from fever. Placing subcutaneous suction drain help to reduce the occurrence of wound infections in such cases. Complete recovery is seen in patient with

intermittent episodes of fever and complication like delayed recovery is seen in those with continuous febrile illness.

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