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Original Research Article

Postoperative fever in patients undergoing elective surgeries-etiology, investigations, management: a longitudinal study

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ABSTRACT

Background: Fever is rise in core body temperature above normal diurnal variations. Surgical procedures often disturb normal physiological process and one such manifestation is rise in body temperature. Present study was conducted to study the etiology of post-operative fever, correlation of etiology of fever with post-operative day of onset of fever and to study the investigations of postoperative fever.
Methods: This study was conducted over a period of 24 months from 1st November 2017 to 31st October 2019 at Department of Surgery at a tertiary care hospital. A total of 339 patients were enrolled. Data analysis done using descriptive statistics and continuous variables were analyzed using Chi square test.
Results: Out of 339 patients of post-operative fever, 207 patients (61%) were in age group of >20-50 years. Mean age was 44.56 years. Male to female ratio was 1.4:1. Maximum incidence of fever were seen after spinal anesthesia. It was observed that the incidence increases as the operative time increases. Incidence were more during months of summer. Around 88.49% developed pyrexia within 48 hours of surgery where no detectable infection was noted. Rest 11.5% had fever after 48 hours of surgery where the causes were UTI (7.4 %), superficial thrombophlebitis (6.8%) or SSI (4.7%). None developed chest infections or DVT.
Conclusions: Fever in postoperative period is common in elective clean surgical procedures, likely due to surgical trauma in the first 2 days and patients should be closely monitored. Fever after 48 hours should be investigated for the cause and treated accordingly.

Keywords: Fever, Postoperative, Surgical procedures

INTRODUCTION

Fever following surgery is a common event occurring in 13-40% of postoperative patients. Fever can occur immediately after surgery and seen to be related directly to the operation or may occur sometime after the surgery as a result of complication related to surgery.[1-3] Surgical trauma is responsible for more than 70% of early postoperative fever episodes.[4] Postoperative fever can be an inflammatory response of the body against operation or symptom of serious infection.[5] Most cases of fever immediately following surgery are self-limiting. So, during fever it is important to recognize when to wait and see approach is appropriate or when further work-up is needed to take immediate action.[6] The present study was conducted to study the etiology of post-operative fever and to study the correlation of etiology of fever with post-operative day of onset of fever and to study the investigations of postoperative fever.

METHODS

This observational study was conducted over a period of 24 months from 1st November 2017 to 31st October 2019 at Department of Surgery at a tertiary care hospital. Ethical approval was taken from ethical committee.

Sample size was calculated Based on the article of Baid et al.[11] A total of 1048 patients underwent elective surgeries out of which 339 patients had postoperative fever which were enrolled in this study.

All surgical indoor patients undergoing clean elective surgery, adult patients (>18 years) of both gender with or without comorbid conditions were included in the study. Patients undergoing clean contaminated, contaminated, dirty surgical procedures and under local anesthesia were excluded from the study. Pre-operative baseline routine investigations and post operatively total leucocyte count, urine analysis, culture from wound or drain site was done with patients of postoperative fever.

Four hourly axillary temperature monitoring was done using digital thermometer and temperature above 100.4°F was noted in temperature charts. Clinical diagnosis of superficial thrombophlebitis and surgical site infection was made if there were signs of inflammation at the local site of intravenous canulation and wound site respectively. Cultures positive for pathogenic organisms were considered positive evidence for infection and were treated accordingly. Data analysis was done using Descriptive statistics. The descriptive factors and clinical factors were presented as descriptive statistics using mean, standard deviation, tables and charts. The continuous variables were analyzed using Chi square test.

RESULTS

In this study total 339 patients of postoperative fever, 202 (59.6%) were males and 137 (40.4%) were females with a male to female ratio of 1.4:1. The mean age of patients was 44.56 years with a standard deviation of ±16.012. Majority 207 patients (61%) were in age group of >20-50 years.

Of the 339 patients, 182 (53.69%) were subjected to spinal anesthesia, 148 patients (43.66 %) and 9 patients were operated with general and epidural anesthesia. Maximum incidence of post-operative fever was seen after spinal anesthesia.

Table 1: Duration of surgery.

Duration of surgery in minutes	Total no. of patients	Patients having post-operative fever	Percentage
< 60	833	227	27.25
>60-100	159	73	45.91
>100-150	56	39	69.64
Total	1048	339	32.5

As evident in Table 1, 227 patients (27.25%) out of 833 had developed post-operative fever who had an operative time of less than an hour. Surgeries having an operative time of more than 60-100 minutes had an inclusion of 159 out of which 73 patients (45.91%) had post-operative fever. Lastly, 39 patients (69.64%) out of 56 patients had post-operative fever who had an operative time of more than 100 minutes. It was observed that the incidence of post-operative fever increases as the operative time increases. The result was statistically significant.

In this study it was observed that the incidence of post-operative fever was more during the months of March, April, May, June. A total of 249 patients had fever during this period. Maximum post-operative fever was seen in month of May.

Out of 339 postoperative patients, 300 patients (88.49%) developed pyrexia within 48 hours of surgery in which no detectable cause of infection fever was found. Fever after 48 hours was found in 39 patients (11.50%) out of which 25 (7.37%) patients had documented urinary tract infection. Superficial thrombophlebitis was present in 23 (6.8%) patients. Wound infection in the form of superficial surgical site infection was present in 16 (4.7%) patients. Leukocytosis was found only 12 patients (30.77%). Catheter associated urinary tract infection (CAUTI) was present in 4 patients which constituted around 16% of total UTI.

Table 2: Day of onset of fever and its etiology.

Onset of post operative fever in hours	Number of patients (%)	Etiology
≤48	300 (88.49)	No source of infection detected
>48-96	25 (7.37)	Superficial thrombophlebitis and urinary tract infection
>96	14 (4.12)	Wound site infection
Total	339 (100)	

DISCUSSION

Fever has been recognized as a component of acute phase response to infection risk, a good understanding of the pathophysiology and pattern of presentation is important as to know when further investigation, wait and watch approach, intervention is needed.[7] The inflammatory response can be induced by infectious or non-infectious etiologies such as surgical procedure. The incidence of fever during the post-operative period seems high, but the reported numbers vary with type and duration of surgery.[1,3] Clinically, fever is considered the earliest and most easily detectable sign of infection in surgical patients. For this reason, it is important to measure core body temperature in the early post-operative period.

In present study, the incidence of post-operative fever in clean elective surgeries is 32.35% which is comparable to previously quoted incidences.

The total number of co-morbid condition is seen in 8% population in this present study. Other studies done by Baid et al and Rao et al, the incidences were 10.6% and 64.54% respectively.[11,12]

The mean duration of surgery (in minutes) in the present study was 56.42±32.4. Studies conducted by Shahabuddin et al, the mean duration of study was 49.10±14.38.[13]

Study conducted by Okechi et al, showed that surgeries more than 120 minutes duration had increased incidence of post-operative fever. It was statistically significant (p value <0.001).[7]

Maximum post-operative fever episodes are associated with general anesthesia as evident by the studies done by Qura-Tul-Ain et al and Okechi et al.[7,10] On the contrary, our study showed the incidence of post-operative fever was significantly more with spinal anesthesia. This may be due to inclusion of only clean elective surgeries in our study which were operated in spinal anesthesia.

Fever within 48 hours of surgery with no cause of infection was found in 88.5% patients in this present study. Other studies by Baid et al 70.12%, Rao et al was 69.1% also showed similar results.[11,12]

Studies conducted by Mermel et al, Leekha et al, Wang et al, Durkin et al showed the incidence of post-operative fever is more during summer season which is comparable to present study.[14-17]

Superficial thrombophlebitis developed in those patients in whom the intravenous access was kept for more than 72 hours, the incidence of which in our study was only 6.8% due to inclusion of only clean elective surgeries who were given only three doses of antibiotics except in patients with indwelling catheters, drains and mesh. Studies done by Baid et al, Okechi et al, and Yadagiri Rao et al showed that superficial thrombophlebitis as a cause of fever in 13.8, 13, 3.6% patients respectively.[7,11,12]

Incidence of urinary tract infection in this present study was 7.4% and the catheter associated urinary tract infection is 16% of total UTI. The most common organism associated with UTI and CAUTI was *E. coli.* Baid et al, Rao et al were found to be 1.14, 5.4 respectively.[11,12]

The incidence of surgical site infection is 4.7% in present study. Rao et al showed higher incidence of postoperative wound infection which can be explained due to inclusion of clean contaminated and contaminated surgeries in the study.[12]

CONCLUSION

It has been found that fever in the postoperative period is a common in elective clean surgical procedures. Fever in the first 2 postoperative days is expected and patients should be closely monitored, but need not be worked up. Pathologic causes need to be further evaluated after post-operative day 3 in the form of superficial thrombophlebitis, urinary tract infection, and superficial surgical site infection. The main limitation of the study was that it did not include patients undergoing contaminated surgeries. Therefore, the main cause of fever in these patients remained unknown. By taking a systematic approach to patients with postoperative fever, clinicians will be able to make better use of resources, limit costly workups, and ultimately improve patient care.

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