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Original Research Article

Evaluation of postoperative pyrexia in general surgery patients in Medicity Institute of Medical Sciences, Ghanpur, Medchal, India

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ABSTRACT

Background: Postoperative fever is one of the most common problems seen in the postoperative ward. Most cases of fever immediately following surgery are self-limiting. The appearance of postoperative fever is not limited to specific types of surgery. 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 an infection at the surgical site or infections that involve organs distant from the surgery. Therefore, during evaluating postoperative fever, it is important to recognize when a wait and see approach is appropriate, when further work-up is needed and when immediate action is indicated.
Methods: The study on the evaluation of postoperative pyrexia is based on 110 patients admitted in Mediciti Institute of Medical Sciences during the period from Jan'2015 to Jun'2016 and who underwent surgery for various surgical causes. The study includes 45 females and 65 males and covers an age group between 10-70 years.
Results: Between the period of Jan'2015 and Jun'2016, a total of 1022 major elective surgical procedures were performed at our hospital. Only 110 patients developed pyrexia in the post operative period. Of the total number of patients (110 cases) who developed pyrexia, 65 patients were males and the remaining 45 were females.
Conclusions: Postoperative pyrexia is a common occurrence in the first 48 hours after surgery and the etiology can be difficult to establish in certain clinical situations. This poses great diagnostic dilemmas to the operating surgeon. Age and Sex of the patient do not significantly influence the occurrence of pyrexia in the postoperative period. The more the number of preoperative co-morbid problems, the more is the complication rate and the delay in recovery from pyrexia.

Keywords: Appendectomy, Fever, Postoperative period, Thyroidectomy

INTRODUCTION

This is an exciting time in medicine. The pace of discovery is accelerating, and new observations are finding more rapid and practical applications than ever before.[1] Colorectal cancer (CRC) is the third most common cancer in men (663000 cases, 10.0% of the total cancers) and the second in women (570,000 cases, 9.4% of the total cases) worldwide.[2] CRC is the third most common cause of cancer death in the world.[3] Although roughly 7% of cases occur in patients younger than 50 years of age, the incidence of colon cancer in the general population increases exponentially after the fifth decade of life.[4]

The male to female ratio is 5:3. In early years of the present century, these malignancies were neglected because disease was less common than now: with less tools for diagnosis, less life expectancy and general unawareness of the fact that malignancy may occur in younger age group. There has been a decline from previous year in deaths as well as in new cases.[5]

Although roughly 7% of cases occur in patients younger than 50 years of age, the incidence of colon cancer in the general population increases exponentially after the fifth decade of life.[6] The male to female ratio is 5:3. Aim of the present study was to explore the disease on clinical presentation, histopathological typing and grading, to determine the nature of surgical procedure and other therapeutic options and to know the outcome of disease.

The pace of discovery is accelerating, and new observations are finding more rapid and practical applications than ever before.[7] Colorectal cancer (CRC) is the third most common cancer in men (663000 cases, 10.0% of the total cancers) and the second in women (570,000 cases, 9.4% of the total cases) worldwide. Aims and objectives of present study were:

- To study the common causes of post operative pyrexia in general surgery patients.
- To study the correlation between the cause and the day of onset of pyrexia.
- To study the risk factors associated with post operative pyrexia.
- To analyze the treatment and remedial means.

METHODS

All the 110 patients were analyzed for some form of preoperative co-morbidity like diabetes mellitus, hypertension, obesity, ischemic heart disease and COPD. A note of all intra-operative problems encountered was made.

The day on which pyrexia appeared, its nature and the corresponding temperature in Fahrenheit has been tabulated. All patients were mobilized as early as possible to prevent Deep Vein Thrombosis. All patients were advocated active breathing exercises, to prevent atelectasis and bronchopneumonia. Pertinent investigations were carried out to identify the exact cause. Patients with wound infection had tissue swabs taken for culture and sensitivity and antibiotics were administered according to the sensitivity of the organism identified.

Respiratory causes of pyrexia were identified by clinical examination following which a chest X-ray, sputum culture and was done. Suspected urinary tract infection was confirmed by catheter tip culture and urine culture and sensitivity. For patients with IV cannula site sepsis, infected cannula was removed and its tip and the blood were sent for culture and sensitivity. Hematomas and seromas were let out, superficial wound infections managed with antibiotics.

Drainage tubes

Negative pressure drainage tubes were placed in the subcutaneous plane in 37 patients and the results have been compared to cases where no drainage tube was used.

Incidence

The incidence of post operative pyrexia varies considerably among various studies in between 14% to 90%, depending on how fever was defined and the study population was considered.[9]

Table 1: Incidence of post operative pyrexia.

Patient group studied	Cause of fever	Total %
Major Abdominal surgeries	Without infection	43
	With infection	36
Open Vs Laparoscopic cholecystectomy	Without infection (open)	55
	Without infection (Laparoscopic)	20
	With infection	0
Other general surgical procedures	Without infection	54
	With infection	10

Although the trauma of surgery and infections are the two main causes of fever, other causes such as blood transfusion, DVT, Pulmonary embolism, myocardial infarction and pancreatitis must be considered. Probably the most common medications causing fever are antibiotics.[10] According to one study, no significant correlation exists between atelectasis and postoperative fever.[11]

Patients and methods

The study on the evaluation of postoperative pyrexia is based on 110 patients admitted in Mediciti Institute of Medical Sciences during the period from Jan'2015 to Jun' 2016 and who underwent surgery for various surgical causes. The study includes 45 females and 65 males and covers an age group between 10-70 years.

Inclusion criteria

All elective major surgical procedures performed in the age group of 10-70 years.

Exclusion criteria

Patients with known infective focus such as peritonitis, appendicitis and immunodeficiency disease.

RESULTS

Incidence of post operative pyrexia

Between the period of Jan'2015 and Jun'2016, a total of 1022 major elective surgical procedure were performed at our hospital. Only 110 patients developed pyrexia in the post operative period.

Table 2: Incidence showing number of observed patients from January 2015 to June 2016.

Pyrexia	No. of patients	Percentage
Present	110	10.7
Absent	912	89.2

n = 1022

Age and sex distribution of patients with postoperative pyrexia

Of the total number of patients (110 cases) who developed pyrexia, 65 patients were males and the remaining 45 were females. 35 patients were younger than 30 years, 48 patients belonged to the age group between 30-50 years and 27 patients were above the age of 50 years.

Distribution of co-morbidities

The most common pre-operative co-morbidity associated with pyrexia was Diabetes Mellitus (28.1%) followed by obesity (27.2%).

Ten patients had other co morbid conditions like asthma, malnutrition etc. Majority of patients (37.2%) had only one pre-operative co-morbidity and only one patient had 4 co-morbidities.

Distribution of day of onset of pyrexia

It was noted that in a majority of cases (69.1%), pyrexia was noticed on the first post operative day. On the second post operative day, 16 patients had fever. In 4 patients, the fever occurred after the first week. The frequency of occurrence of pyrexia on the different post operative days is shown in Table 3.

Table 3: Distribution showing number of observed patients on the day of onset of pyrexia.

Day of pyrexia	No. of patients	Percentage
Day 1	76	69.1
Day 2	16	14.5
Day 3	2	1.8
Day 4	2	1.8
Day 5	4	3.6
Day 6	2	1.8
Day 7	4	3.6
Week 2	3	2.7
Week 3	1	0.9
Week 4	0	0

n = 110

Temperature distribution

The Temperature increase and the Maximum and Minimum temperatures noted on the different days of fever are shown in Table 4.

Table 4: Temperature distribution in °F scale.

Day of pyrexia	Mean (°F)	Minimum	Maximum
Day 1	101.5°	100°	103°
Day 2	101°	100°	102°
Day 3	101°	100°	102°
Day 4	101°	100°	102°
Day 5	101°	100°	102°
Day 6	100.5°	99°	102°
Day 7	101°	100°	102°
Week 2	100.5°	100°	101°
Week 3	101°	100°	102°
Week 4	98°	98°	98°

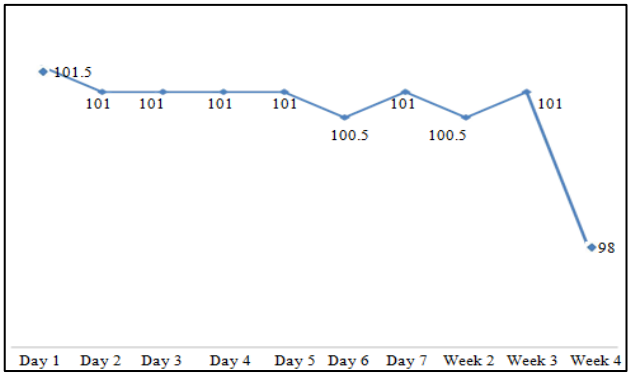

Figure 1: The mean temperature (OF) from Day1 to Week 4.

Distribution of type of pyrexia

The most common type of fever noted was intermittent (97.2%) and only 1 patient had a continuous fever (0.9%).

Distribution of pyrexia with intraoperative problems

The intra operative problems like difficulties during surgery and tissue handling, bleeding, intra operative hypotension were correlated to the development of pyrexia.

Table 5: Distribution showing etiology of pyrexia.

Etiology	No. of patients (Nos.)	%
Infection	40	36.3
Seroma	35	31.8
Tissue damage	13	11.8
Urinary tract infections	6	5.4
IV line infection	4	3.6
Hematoma	3	2.7
Drain site infection	3	2.7
Atelectasis	2	1.8
URI/LRI	2	1.8
Abscess/collections	1	0.9
Pneumonia	1	0.9
Sepsis	0	0

n =110

Distribution of etiology of pyrexia

The most common Etiology of pyrexia was wound infection (37%) followed by seroma (27%). The data collected on the etiology is presented in Table 5.

Pathogen profile for pyrexia

The pathogen profile was studied by culturing the specimens in suitable media and the results interpreted and correlated to the occurrence of post operative pyrexia. The most common organism grown was *E. coli* (43.7%). The data collected has been summarized below:

Table 6: Distribution showing pathogen profile for pyrexia.

Type of organism	No. of patients	%
E. coli	21	43.70
Klebsiella	6	12.60
Proteus	7	14.60
Pseudomonas	5	10.40
Streptococcus	1	2.10
Staphylococcus	3	6.20
No Growth	5	10.40
Total	48	100.00

Outcome of post operative pyrexia

Majority of patients who had post operative pyrexia made a complete recovery (97.2%). A total of 1 death was noted.

A 63 year female patient underwent a meshplasty for an incisional hernia. The patient was a known case of Diabetes Mellitus, Hypertension with a history of Ischaemic Heart Disease.

The patient developed a Surgical Site Infection on the 3rd POD for which wound care was regularly given. Patient suffered a Myocardial Infarction on the 9th POD leading to her death.

Table 7: Distribution showing outcome of post operative pyrexia and frequency of the outcome.

Outcome	No. of patients	Frequency
Complete recovery	107	97.2
Complications	2	1.8
Death	1	0.9

n = 110

DISCUSSION

The analysis of data consisting of 110 patients who developed post operative pyrexia between the period of Jan'2015 and Jun'2016 is presented here. The correlation between different variables and the occurrence of pyrexia is discussed.

Age and sex distribution

From the statistical analysis of data collected it was evident that age and sex do not significantly contribute to the occurrence of postoperative pyrexia and the outcome after the febrile phase.

Table 8: Outcome age and sex distribution.

Age	Complete recovery (No. of patients)	Complications (No. of patients)	Death (No. of patients)
>30yrs	34	1	
30-50yrs	47	1	
>50yrs	26		1

Distribution of co-morbid conditions

The effect of preoperative problems which patients had were compared to the various etiologies of pyrexia. It was found that the more the number of preoperative co-morbid problems (like diabetes mellitus, hypertension, IHD, COPD, obesity) encountered, the more was the complication rate and delay in recovery from the pyrexial phase. If any one of these preoperative co-morbidity was present, then the incidence of complications like seroma (P <0.05*), infection (P<0.01**), atelectasis (P<0.01**) was more and the data analysis was found to be statistically significant. When the preoperative problems were compared to the different outcomes (like complete recovery, complications, death), then it was found that these problems significantly contributed to the incidence of postoperative pyrexia.

The P value was <0.01** which is statistically significant at 1% level. It was also found from the present study that when preoperative co-morbidity is present the incidence of pyrexia was more on days 3,5,6,7 and second week and this was statistically significant. The P value for such patients with fever on day 3 is <0.01** and <0.05* on the 5th and 6th day.

Distribution of pyrexia with the duration of surgery

One of the aims of the study was to analyze if the duration of surgery had any correlation to the day on which the pyrexia appeared and it was found that the fevers occurring on day 3 (P<0.01**), day 5 (P<0.01**), day 6 (P<0.01**) and day 7 (P<0.01**) were associated significantly to the duration of the surgical procedure.

The more the duration of surgery, the higher was the degree of pyrexia. This is related to the higher incidence of tissue damage and seroma (P<0.01**).In one study, the amount of IL-6(pyrogenic cytokine) increase was found to correlate with the duration of the surgical procedure and therefore the higher incidence of pyrexia in patients who had a prolonged surgery[12].The occurrence

of pyrexia was significantly related to the duration of surgery (P<0.05*).

Distribution of type of pyrexia

The type of fever was correlated to the outcome of the patient recovering from the stress of post-operative pyrexia and this was found to be statistically significant (P<0.01**). One patient with a continuous type of fever had 100% mortality. Whereas, patients with intermittent pyrexia invariably had a complete recovery.

Distribution of pyrexia with intraoperative problems

The intra operative problems like difficulties during surgery and tissue handling, bleeding, intra operative hypotension were correlated to the outcome and the findings were statistically significant at 5% level (P<0.05*). It can be noted from the table below, that 1 patient who had intra operative problems, died due to some complication, whereas none died if no intra operative problem was encountered.

Complete recovery was seen in 96.4% of patients with no intra operative problems. It was also noted from the present study that fever occurring on days 2 (P<0.01**), 3 (P<0.05*), 6(P<0.05*), 7(P<0.01**), were associated in a significant manner to the presence of intra operative problems. The etiology of pyrexia and the day on which the fever occurred was also correlated in order to find out the most common cause of pyrexia on days 1 to 2, 3 to 5, 6 to 7 and after the first week.

Distribution of days of onset of pyrexia

Pyrexia on days 1-2

On the first two immediate post-operative days, the most common cause of pyrexia was found to be mainly due to wound complications like hematoma, seroma and tissue injury due to surgery. Although infection was noted to cause fever on the first two days in 21% of the cases, it is comparatively less than the occurrence on the subsequent days. In the article by James et al (2006), most early post-operative fevers (within the first 48 hours) had no clearly defined infectious cause and resolved without therapy[13]. Other causes of pyrexia in the first two postoperative days include post-operative atelectasis, other site sepsis and thrombophlebitis of intra venous lines. But statistically, these etiologies are not significant.

Pyrexia on days 3-5

Between Days 3 to 5, the most common etiology causing pyrexia was noted to be wound infection and other site sepsis like infection of intra venous lines, drip and drain site infections, abscesses and collections depending upon the type of surgery performed. One case of bronchopneumonia was also noted during this period. Other causes include phlebitis, seroma.

These data are similar to ones noted by Herve D et al.[14]

Pyrexia on days 6-7

Literature suggests that the most common cause of pyrexia on the postoperative days 6 and 7 is venous thrombosis in the pelvis and limbs[15].

Since all our patients were mobilized early and were given good postoperative care, none of them developed venous thrombosis and pulmonary embolism. The common cause of pyrexia in present study was wound complications, wound infection and other site infection, with contributions from other causes like phlebitis.

Pyrexia after the first week

After the first week, the causes were less likely to be directly related to specific operations undertaken. Here the etiologies include wound sepsis, distant site sepsis and phlebitis.

Treatment and outcome

The entire population of 110 patients was managed by surgical or conservative lines. Patients with mild pyrexia were managed conservatively by offering simple antipyretics. Other minor complications like pulmonary and urinary tract infections were managed with medical measures. Wound complications like hematoma, seroma, infection was managed by letting out the collection and followed by secondary suturing once the wound showed signs of healing. A total of 1 death which occurred was found to be directly related to the presence of co-morbidities and problems in the perioperative period.

CONCLUSION

Postoperative pyrexia is a common occurrence in the first 48 hours after surgery which poses great diagnostic dilemmas to the operating surgeon. The more the number of preoperative co-morbidities, the more is the complication rate and the delay in recovery from pyrexia.

The longer the duration of the surgical procedure, the greater is the tissue damage, bleeding, wound infections and wound complications, the delay in the recovery from pyrexia. Drainage tubes help to reduce the incidence of wound complications like hematoma and seromas. After first week, the causes were less likely to be directly related to specific operations undertaken. Finally, complete recovery is the rule in majority of patients with a minor febrile episode and complications occur more commonly in those with a continuous febrile illness.

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