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**ORIGINAL RESEARCH**

# The Assessment of Surgical site infection in patients undergoing elective Laparoscopic Cholecystectomy

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## ABSTRACT

**Introduction:** Laparoscopic Cholecystectomy has become the standard treatment for symptomatic cholelithiasis. Despite the advances in the fields of antimicrobial agents, sterilization techniques, port site infections still prevail. These post-operative wound infections have an enormous impact on patient's quality of life and contribute substantially to financial cost of patient care. The present prospective study was conducted to assess the incidence, risk factors and organism associated with surgical site infection in cases undergoing elective laparoscopic cholecystectomy in Shri Mahant Indiresh Hospital. **Aim**: The assessment of surgical site infections in patient undergoing elective laparoscopic cholecystectomy. **Patient and methods**: This prospective observational study was conducted in SMI hospital for period of 18 months. 100 patient were taken for study after informed written consent. The assessment of surgical site infection was done in these patients after following standard criteria. **Results**: The incidence of SSI was found in 6% cases included in study. SSI was higher in elderly, male gender, patients with DM and when operative time was more than 60 minutes. SSI was common in epigastric port. Staphylococcus aureus was the comment organism. **Conclusion**: Despite advances in minimal access surgery, surgical site infections can still be problematic in few cases, although incidence is less than in open surgeries.

**Keywords**: Surgical site infections, Laparoscopic cholecystectomy, post site infection.



## INTRODUCTION

Ever since Philips Mouret reported the first laparoscopic cholecystectomy in 1987, this approach has been adopted for many other surgical procedures including appendicectomy, herniorraphy, colonic surgery[(1,2)].Preventing Surgical site infection is an essential factor in improving the results of surgical procedures. At present laparoscopic cholecystectomy has become the standard treatment for symptomatic cholelithiasis. The main advantage are less post-operative pain, small incision and shorter hospitalization [(3).] Incidence of surgical site infections after elective laparoscopic cholecystectomy, is less than that of open cholecystectomy due to shorter length of incision [(4).]Surgical site infections are infections consequent to the surgery that are present within a month of the operative procedure.Worldwide the most common surgical procedure is Laparoscopic Cholecystectomy (LC), It is the second most commonly performed abdominal operation in the general surgery practice.[(5,6,)] It has been extensively used as it is considered a procedure with low surgical infection and low-risk operation.

Surgical infections are those that arise as a result of surgery, or those that involve surgery as part oftheir care. Surgical site infections are the 2nd cause of hospital acquired infections.Up to 2%- 5% patients undergo clean extra abdominal operations and up to 20%undergoing intra-abdominal operation will develop an SSI.[7,8,9]The rate of infectivity vary according to the procedure, less than 3 infections per 100 for clean procedures, up to 4 per 100 for clean contaminated procedures and up to 9 per 100 for grossly contaminated procedures.[10]

## MATERIALS AND METHODS

The study will be conducted on patients undergoing elective laparoscopic cholecystectomy at SMIH ofDepartment ofSurgery.

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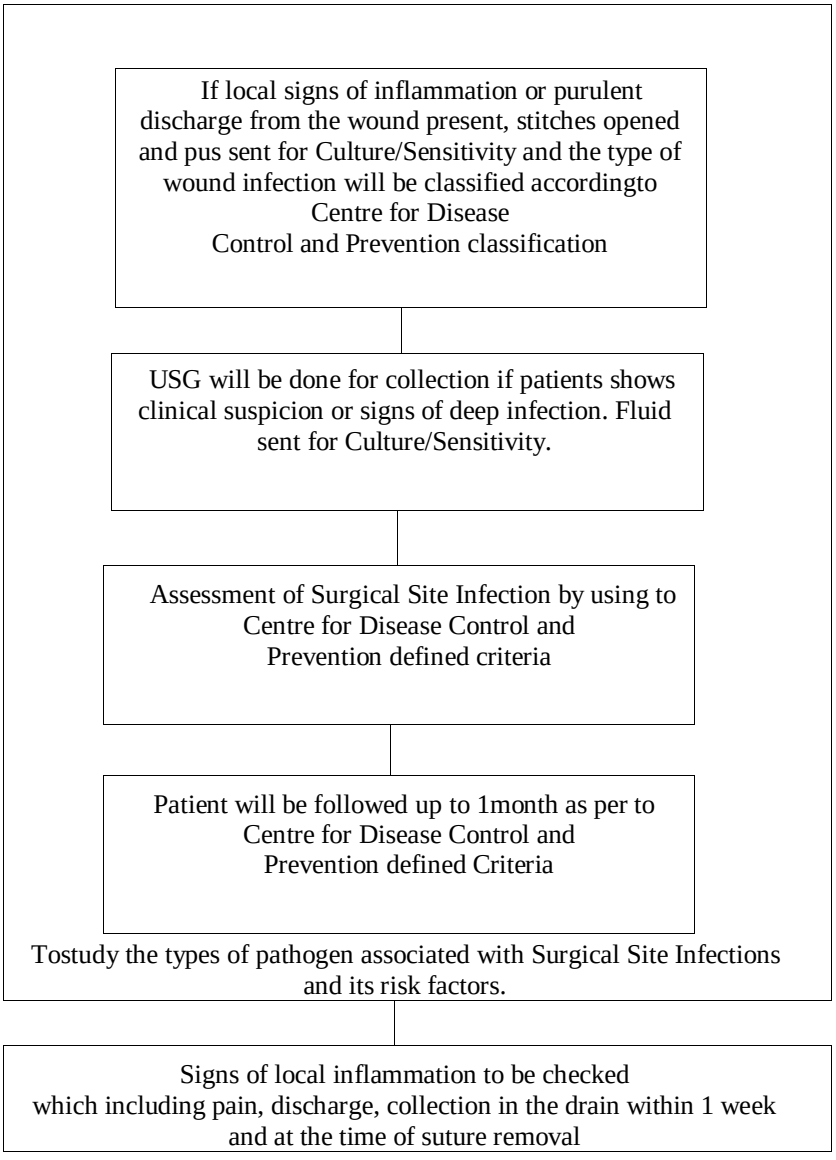
**Study design: -** A prospective observational study.

**Period: -**period of 18 months.

**Sample size: -**100 patients will be taken in the study.
The study population will constitute of cases of symptomatic cholelithiasis diagnosed by ultrasonography who will undergo elective LC

**METHODOLOGY**

Identify the patients with Cholelithiasis diagnosed by USG undergoing elective Laparoscopic Cholecystectomy.
Written informed consent taken. Pre-Operative Work done (Detailed History and Examination; all routine investigation and other Pre-Op Investigation required for GA done)
Laparoscopic cholecystectomy done.
In post-operative period, surgical site will be examined daily.




**OBSERVATION AND RESULTS**

The present study was a hospital based prospective study conducted in department of surgery in Shri Guru Ram Rai Institute of medical and health sciences and associated Shri Mahant Indiresh hospital, over 18 months (from 1 January 2023 to 30 june 2024).

100 patients who met the inclusion criteria were taken up for this study, In 37 patients age were more than 50 years and in 63 patients age were less than 50 years (figure 1).

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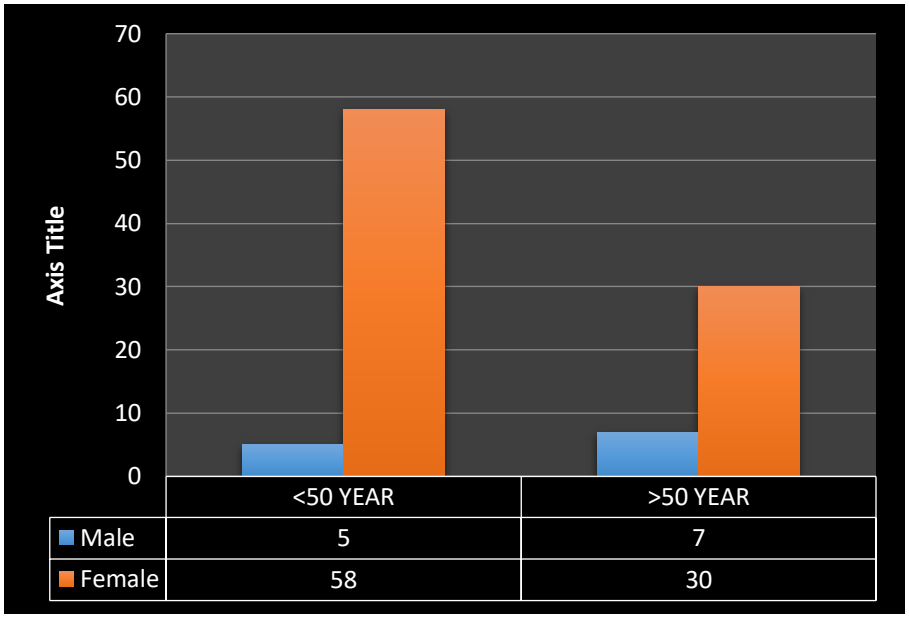
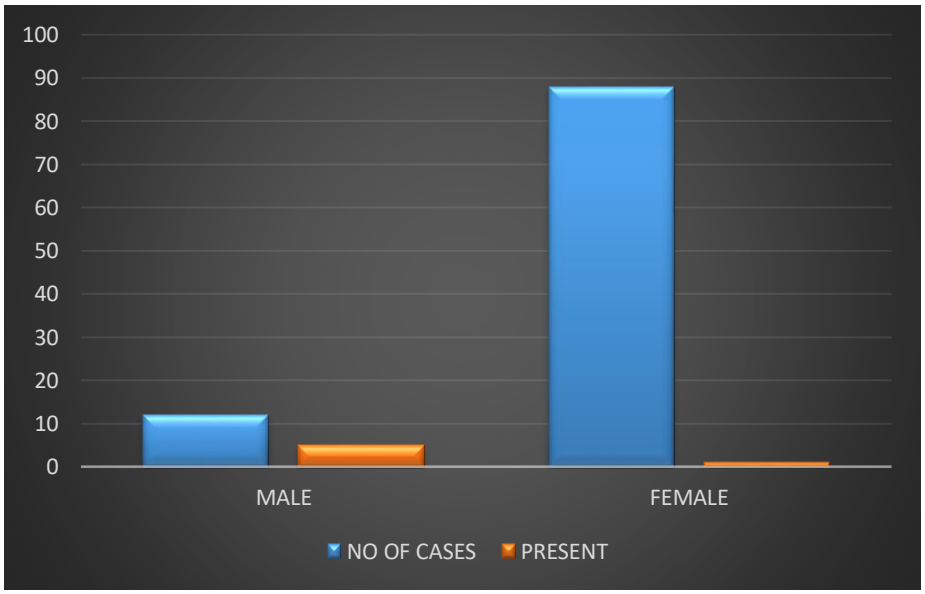



In our study, 63 patients were less than 50 year of age and 37 patients were more than 50 year of age, in which 5 male and 58 female were less than 50 year of age and 7 male and 30 female were more than 50 year of age (FIGURE 1)

| AGE GROUP f | Surgical Site Infection Present | No Infection | |
|---|---|---|---|
| **<50 YEAR 63** | 0 | 63 | |
| **>50 YEAR 37** | 6 | 31 | P=0.001 |

In our study, out of 100 patients in 63 patients age was less than 50 years in which no SSI were found and in 37 patients age was more than 50 years in which 6 patients of SSI were found. Age more than 50 year was correlated with SSI which was statistically significant. (TABLE 1).




Out of 100 patients 88 patients were female in which 1 patient of SSI was seen and male patients were 12 in which 5 patients of SSI was seen. In male incidence was higher which was statically significant. (FIGURE 2)

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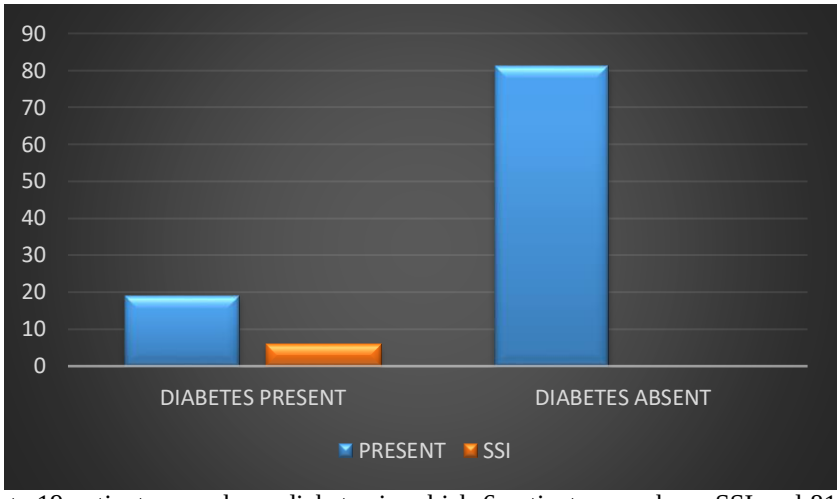
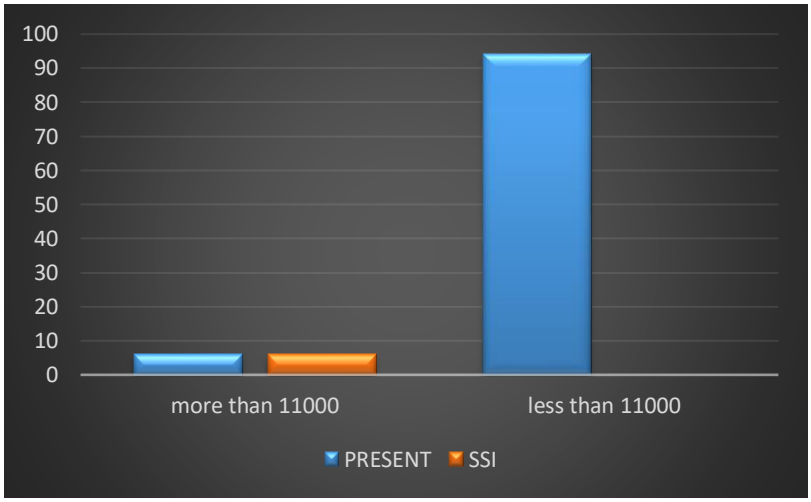
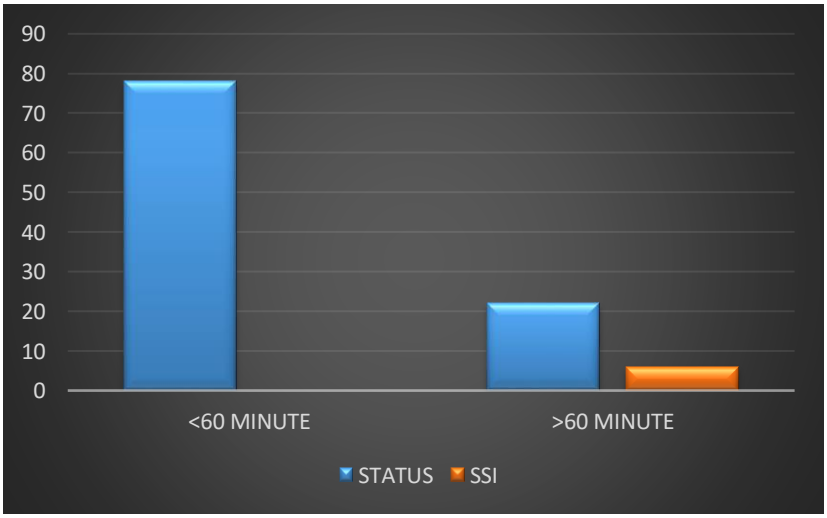



Out of 100 patients 19 patients were have diabetes in which 6 patients were have SSI and 81 patients not had diabetes in which no SSI seen. Co-Relation of diabetes mellitus with surgical site infection was statistically significant. (FIGURE 3)




6 patients had pre-operative TLC count more than 11000, in which 6 patients of SSI were seen and in 94 patients had TLC count less than 11000, in which no SSI was found. Co-Relation of pre-operative TLC count with surgical site infection was statistically significant. (FIGURE 4)




Duration of surgery was less than 60 minute in 78 patients in which no SSI was seen and in 22 patients duration of surgery was more than 60 minute, in which SSI was present in 6 patients. Co-Relation of duration of surgery more than 60 minute with surgical site infection was statistically significant. (FIGURE 5)

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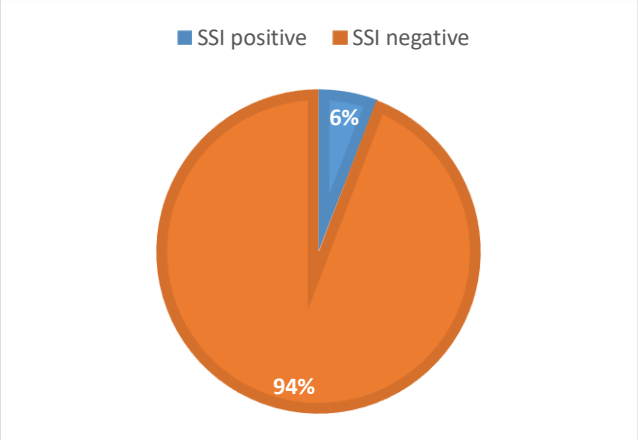
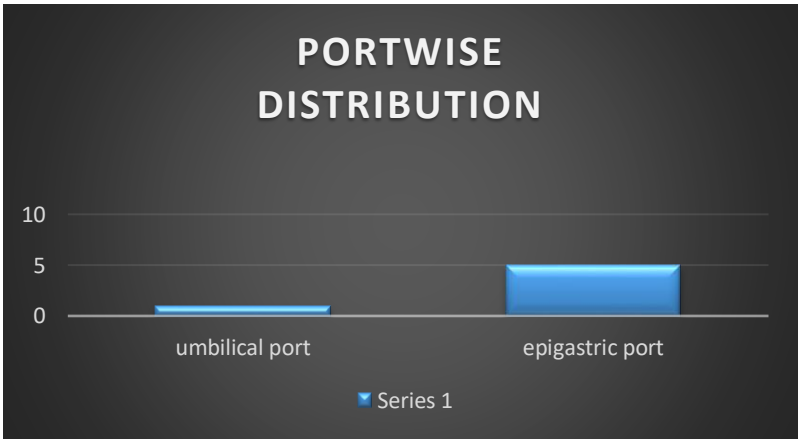



6 cases were showing SSI and 94 cases were with-out SSI. the incidence of surgical site infection is 6.(FIGURE 6)

| WOUND CULTURE REPORT | F |
|---|---|
| E.COLI | 2 |
| ENTEROBACTOR CLOACAE | 1 |
| STAPHYLOCOCCUS | 3 |
| ABSENT | 94 |

The wound culture report case frequency distribution of the study subjects. *Staphylococcus aureus* were in 3 cases followed by *E.coli* 2 cases and *Enterobactor cloacae were in* 1 case in our study.(TABLE 2)




The surgical site infection was present in 6 cases in which, SSI was present in epigastric port in 5 cases and was umbilical port in 1 cases, in which *Staphylococcus aureus(1) was* present in umbilical port and in epigastric port *E.coli(2), Enterobactor cloacae(1)* and *Staphylococcus aureus(2)was* present. (FIGURE 7)

## DISCUSSION

Surgical Site Infections (SSIs) is one of the bothersome complications which hampers the profit of MAS. These not only adds morbidity of the cases but also plays a major role in spoiling the surgeon's reputation, SSIs still prevails, although there have been many advances in the fields of operating room ventilation, surgical techniques, antimicrobial agents, and sterilization techniques.According to the age-wise distribution of the study subjects, it was observed that the most common age group in our study, with the majority of the cases was less than 50 years (63%), followed by the age groups more than 50 years (37%) in which all 6(16.21%) SSI cases found in age group more than 50 years .However, Siddalinga et al. in his findings reported that the most common age group was 71-80 years that was observed with 50% of the cases.[11]

The gender wise distribution of the cases in our study it was recorded that the majority of the cases were female (88%) followed by male cases (12%), in which SSI seen more in male than female. According to a study conducted by William G. Cheadle,[12] it has been reported that SSIs are developed in approximately 5% of the patients undergoing surgery which might cause much morbidity and might be sometimes fatal. In relevant to our study, a study conducted by Makadia JM et al.[13] recruited a total patients of cholecystitis undergoing cholecystectomies for Surveillance of surgical site infections. Female preponderance was reported in their findings. Moreover, it was revealed that all the patients who had developed SSIs were

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males. On the other hand, study conducted bysaddlingaet al.[11] reported that the incidence of infections among female more than in males. Out of 100 cases, it was observed that 80 male cases followed by female cases (20 cases).

In our study, the Frequency of relation of diabetes with surgical site infection. in this diabetes mellitus present in 19(19%) cases in which, the surgical site infection showing in all 6(31.35%) cases with diabetes mellitus.One of the most important complications caused by surgery in diabetics is wound infection. Diabetics are more prone to different infections (such as surgical infections) due to the defect of their immune system (Lawarence, 1994). A similar study reported a complication rate of 21% and 9% for diabetic and non-diabetic patients, respectively. According to these studies, complications in diabetics are significantly higher than non-diabetics (P<0.05) (Landau *et al.,* 1992). In this study, the rate of outbreak of postsurgical complications in diabetic and non-diabetic patients was 36.66% and 13.33%, respectively.

Our study showed that the majority of the cases were recorded without any spillage 58% whereas there were 42% cases observed with spillage out of which 14.28% was SSI.

Our study reported that the majority of the patients (78%) had the duration of the surgery less than 60 minutes followed by 22% with the duration of surgery more than 60 minutes. in which all surgical site infection cases (27.27%) found more than 60 minute duration of surgery, which is statically significant. However, Siddalinga et al.[11] reported that the least number of the cases had the duration of surgery <1.5 hrs (7.69%) whereas the remaining cases (28.5%) with the duration of surgery between 1.5 to 4 hours. In surgeries of less than the duration of 30 minutes, a nil infection rate was reported by Lilani et al.[15]For procedures which tookmore than 2 hours or further, a significant increase in SSIs was noticed.

Moreover, our study showed that age and duration of surgery was significantly correlated with gender, Moreover, according to the port-wise distribution of the study subjects it was observed that the majority of the infection in epigastric Port followed by umbilical Port. However, in relevant to our findings, Ashwani Kumar et al[16] in his findings reported that umbilical port was the most common site for all the infections. On the other hand, in case of sepsis following laparoscopic cholecystectomy, the umbilicus is the commonest site according to Gaur &Pujahari. On contrary to our findings, Karthik et al.[17] the most common port was Umbilical that was observed with the majority of SSIs.

The frequency distribution according to the wound culture of the study subjects in our study, it was reported that Staphylococcus aureus was isolated in 3 cases (3%), E.coli in (2%) and Enterobactor cloacae in (1%) whereas in 94 of the cases, none of the organisms was isolated. On the other hand, the findings by Siddalinga et al[11]revealed that out of the total cases, the majority of the cases were observed with the isolated organism Pseudomonas (40%) followed by the other organisms like Staphylococci (26.6%), E.coli (20%), and Klebsiella (13.5%).However according to the findings ofKownhar et al.[18] in open surgical procedures as well as in MAS, the superficial SSIs were commonest and the most common isolate was Staphylococcus aureus. SSIs were studied in their findings and various isolated bacterias were discovered such as Staphylococcus aureus, Pseudomonas aeruginosa, Klebsiella pneumonia, Acinetobacter spp., Proteus spp., Escherichia coli,

## CONCLUSION

This study was done in 100 patients who underwent laparoscopic cholecystectomy in Shri Guru Ram Rai Institute of medical and health sciences and associated Shri Mahant Indiresh hospital, over 18 months (from 1 January 2023 to 30 June 2024).

- The incidence of SSI was found 6% in laparoscopic cholecystectomy.
- SSI rate was higher and statistically significant in patients in which age was more than 50 years.
- SSI rate was higher and statistically significant in Male gender.
- SSI rate was higher and statistically significant in patients suffering from diabetes mellitus.
- SSI was higher and statistically significant if pre-operative TLC count was more than 11000.
- SSI was higher and statistically significant in-Operative time was more than 60 minutes.
- SSI was higher and statistically significant in intra-operative spillage of bile.
- SSI was common in epigastric port 5(83.33%).
- Most common isolated organism was staphylococcus aureus 3(50%).

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