

**COSTA FRACTURE PATIENTS WITH CLIPPING COSTAE MANAGEMENT AT
THE WEST NUSA TENGGARA PROVINCIAL GENERAL HOSPITAL FOR THE
PERIOD JANUARY 2021 - JUNE 2023**

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ABSTRACT

Background: The ribs play a role in protecting the organs in the chest cavity. The ribs are also attached to the vertebrae to increase stability. Farktur costae occurs when there is a significant force on the costae or ribs. Costae fractures usually occur at the point of impact or posteriorly which is structurally the weakest part which at a severe rate can lead to the occurrence of flail chest. This causes pain at the fracture site, bruises, crepitations, and decreased ability to do full inspiration. With increasing morbidity and mortality rates due to costae fractures and affecting the quality of life of patients. Therefore, appropriate follow-up is needed in handling the costae fracture, which can be done surgical / operative fixation (clipping costae) more useful after nonoperative action.

Method: This study is a descriptive study that uses secondary data in the form of x-ray (radiology) results and medical records of costae fracture patients at the West Nusa Tenggara Provincial General Hospital for the January 2021 – June 2023 period.

Results and Conclusions: There were 19 cases of costae fractures with clipping costae management handled by NTB Provincial Hospital in the January 2021 – June 2023 period. The incidence of costae fractures is more prevalent in the age group of 45-54 years (31.58%), dominated by the male sex most patients experience multiple costae fractures with comorbidities can be pneumothorax, pulmonary contusion, hemothorax, and pleural effusion. The treatment performed on costae fracture patients is in the form of clipping costae which aims to stabilize and accelerate the healing process with minimal complications from the procedure. Operative management in the form of surgical fixation has been widely done with advantages that can reduce the number of complications due to costae fractures. Surgical fixation with clipping costae is considered a safe procedure with a very low risk of complications with satisfactory long-term results. The prognosis depends on the severity of the trauma suffered.

Keywords: HD, CD

INTRODUCTION

There are 12 pairs of ribs in the thoracic region with the first seven ribs attached to the sternum anteriorly and to the vertebrae posteriorly, the eighth to tenth ribs are also attached in the same way to the costae cartilage of the sternum anteriorly, the eleventh and twelfth ribs are called floating ribs because they only attach to the posterior part.¹ The ribs play a role in protecting the organs located in the chest cavity. Several layers of muscles that help breathing play a role in connecting the ribs to one another. The ribs are also attached to the vertebrae to increase stability.²

Costae fractures occur when there is significant force on the costae or rib cage. Fractures of the costae usually occur at the point of impact or at the posterior part which is structurally the weakest part. More complex fractures can lead to asymmetry of the thorax or flail chest. This occurs when a costae fracture occurs in several adjacent costae, causing a floating rib segment and causing this segment to move paradoxically with the rest of the chest wall.¹

Common mechanisms of causing costae fractures are blunt force trauma such as car accidents, falls from height, assaults and even severe coughing. On the patient's quality of life. Therefore, appropriate follow-up is needed in the treatment of

these costae fractures, which can be carried out surgical / operative fixation (clipping costae) is more useful after nonoperative action.

METHODS

This study is a descriptive study using secondary data in the form of radiology results and media records of patients with costae fractures at the West Nusa Tenggara Provincial General Hospital for the period 2021-2023.

The criteria that can be included in this study are radiological images of the anteroposterior (AP) position and medical records that indicate a costae fracture. Criteria that cannot be included in this study are patients whose medical and radiology records are incomplete.

RESULTS

There were 19 cases of costae fracture with costae clipping management treated by the NTB Provincial Hospital in the period 2021-2023. The incidence of costae fractures was more prevalent in the 45-54 year age group (31.58%), dominated by male gender and the location of the fracture was more nonbilateral with 18 cases mostly in the dextra or right location (Table 1.). Most costae fractures were caused by traffic accidents and more multiple costae fractures occurred with

comorbidities such as pulmonary contusion, hemothorax, pneumothorax, and pleural effusion (Table 2.).

Table 1. Characteristics of Costae Fracture Patients at RSUD

Variable	Criteria	Total	Percentage
Gender	Man	17	89.47%
	Woman	2	10.53%
Usia	15-24	1	5.26%
	25-34	1	5.26%
	35-44	3	15.79%
	45-54	6	31.58%
	55-64	5	26.32%
	65-74	2	10.53%
	≥75	1	5.26%
Bilateral	D/S	1	5.26%
Nonbilateral	D	14	73.68%
	S	4	21.06%

Table 2. Location and Comorbidities of Fracture Patients

Gender	Age	Fractur Costa	Accompanying
M	48	2-10	Contusio Pulmonum
M	29	8-11	Pneumothorax
M	63	7-9	Pneumothorax
W	43	4-8	-
W	65	3-6	Contusio Pulmonum
M	55	5-9	Hemothorax
M	58	10	Hemothorax
M	51	4-8D/3-5S	-
M	60	6	Pneumothorax
M	60	4-5	Efusi Pleura
M	65	6-7	-
M	98	6,8,9,10	-
M	23	7-8	-
M	48	4,6	-
M	53	4-6	Efusi Pleura
M	40	4	-
W	47	3-4	-
M	35	8-10	-
M	45	8-9	-

DISCUSSION

Management of costae fractures aims to restore pulmonary function and address the underlying thoracic injury to prevent respiratory complications. A number of patients with simple or multiple costae fractures at the NTB Provincial Hospital underwent operative management (clipping costae). Clipping costae is a curative measure by joining the broken parts of the costae through a surgical process. Open surgical fixation of costae fractures dates back to the 1940s, some costae fractures were treated nonoperatively. Over the past few years, there has been increasing research on the better outcomes of Open Reduction Internal Fixation (ORIF) for stabilization of costae fractures with flail chest compared to nonoperative management with the primary goal of osteosynthesis so that the surgery aims to restore chest wall stability and improve mechanical integrity while utilizing conservative therapy.¹⁰ Costae fractures with flail and non-flail chest that are managed operatively show promising results, namely the incidence of pneumonia, hemothorax, pneumothorax is less, and the length of hospitalization in the ICU is shorter and can move to normal activities faster.¹⁰

Based on a systematic review and meta-analysis conducted by Sawyer (2022), surgical fixation is most beneficial for flail chest patients who undergo surgery within 72 hours. Surgical fixation was previously only performed if conservative treatment had failed, performed in patients with severe flail chest, multiple costae fractures with severe displacement, persistent pain that could not be controlled, chest deformity, and/or failure to use mechanical ventilation.¹² However, the indication for surgical fixation as the main management is increasingly widespread due to the advantages of surgical fixation management while still considering the criteria for patients who require surgical fixation. A number of studies have also supported the benefits of surgical fixation outcomes including ICU and hospital length of stay, mortality, mechanical ventilation, pulmonary complications, tracheostomy, and preventing damage to internal organs protected by costae.¹¹

The results of a study conducted by Peek et. al (2020) showed that the incidence of complications and outcomes after costae fixation included determine the quality of life of patients after surgery. The results of the study showed that the costae fixation procedure is considered a safe procedure with the lowest risk of complications and satisfactory long-term results seen from low

infectious complications and complications requiring immediate treatment (surgery).¹²

CONCLUSION

A costae fracture is a trauma or injury to the os.costae that generally occurs due to blunt trauma. The elderly tend to be more prone to costae fractures than children and are more likely to be male than female. Various imaging modalities have been used with varying accuracy in the diagnosis of costae fractures. Pain control is fundamental in the management of costae fractures to reduce intercostal muscle contraction and spasm around the fracture site and clear pulmonary secretions. The most severe complication associated with rib fractures is flail chest and damage to underlying structures. Operative management in the form of surgical fixation has been widely practiced with the advantage of reducing the complication rate of costae fractures. Surgical fixation with clipping costae is considered a safe procedure with a very low risk of complications with satisfactory long-term results. Prognosis depends on the severity of the trauma sustained and the level of pain.

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