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Comparative Analysis Of Image Information Radiology Examination Of Scapulary Y View PA Oblique Projection With Variation Direction Central Ray 0° and 10° Caudally In Clinical Frozen Shoulder

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ABSTRACT

Background : Based on results observation in government hospital radiology in Jakarta Region**,** for scapulary Y view for clinical frozen shoulder often use projection PA Oblique 10° caudally whereas according to Ballinger (2018) Examination scapular radiology Y View using projection PA Oblique with direction ray 0□. **Objective study :** the aim of the research is to know about Techniques and results description as well as Comparison of Scapular Y view PA Oblique in direction ray 0° and direction 10° rays Caudally, in patients with Clinical frozen shoulder with central ray direction 10° caudally . This Study also aims to desicion, setting direction the most informative light for the patient with clinical Frozen shoulder . **Research method :** The type of research used is type quantitative descriptive . Data obtained with do observation and direct taking description radiography scapular Y. Radiographic image the done questionnaire by 6 respondents, consisting of from 3 radiographers and 3 doctors specialist Radiology . **Research results :** Examination techniques scapular Y view with use direction ray 10° caudally to own information more diagnostics Good For diagnose frozen shoulder, where in the project This allows projection more light parallel with field scapular, so that reduce superimposition structure bones and clarify visualization important anatomy in the diagnosis of frozen shoulder , however thus , cornering Central Ray 0° also has good character to see the resulting details in accordance with literature . At Central Ray Direction 10° caudally it is more optimal, which has quality description acromioclavicular joint, glenohumeral joint, and supraspineal outlet are more optimal than direction ray 0°.

Say key : Scapular Y view , Frozen shoulder .

INTRODUCTION

The anatomy of the shoulder joint consists of bones, joints, ligaments, muscle tissue, and biomechanics. The shoulder joint consists of three bones, namely: the clavicle, the scapula, and the humerus. The function of the clavicle and scapula is to connect each upper limb to the trunk or axial skeleton (1). The shoulder joint has capsule joints protector in the form of in the form of interconnected connective tissue relate with strong. Capsule joints the protect the shoulder joint including is muscles and ligaments . Frequent complaints appears on the shoulder joint is instability of the shoulder joint which will cause injury to the glenohumeral joint and the articulating head of the humerus with relative glenoid flat . One of the frequent complaints found is frozen shoulder, which is something condition Where there is stiffness in the shoulder joint due to thickening and contraction capsule joints that cause decline capsule volume capacity . Stiffness in frozen shoulder is also divided into two kinds pattern that is pattern capsular and non- capsular patterns . Non- capsular pattern is patterns that are not specific marked with limitations movement and pain that occurs in the direction movement certain, depending from hat lesions , for example limitations toward endorotation or abduction only (11).

Frozen shoulder, or adhesive capsulitis, is a painful shoulder condition caused by thickening and tightening of the connective tissue capsule around the shoulder joint. Frozen shoulder is something poor conditions commonly understood involves substantial pain , borderline sufficient movement and mobility large . Capsular pattern shoulder joint, namely movement the most limited and sought after exotation Then followed movement abduction and endorotation, then accompanied by existence decline ability functional (9).

In 2018, data on patients suffering from frozen shoulder or shoulder joint disease worldwide was around 41% (17). In 2018, the incidence of joint disorders in Indonesia was 7.3%. Meanwhile, data from the 2018 DKI Jakarta Province Riskesdas showed that patients with clinical frozen shoulder were around 5% of the total population of DKI Jakarta Province (12). Frozen shoulder mostly attacks people aged 40-60 years. The incidence in women is 1.6 to 4 times higher than in men (6).

A supporting examination to assess the condition of frozen shoulder is a radiological examination. To detect glenohumeral dislocation, the projections often used are: Scapular Y view. This projection can also provide additional information in cases of frozen shoulder, especially to evaluate the relative position of the humerus to the glenoid cavity. The results of the scapular Y view examination in diagnosing frozen shoulder are part of the radiological evaluation for diagnosis and provide a general picture of the anatomical position of the shoulder joint (9).

Recommended radiographic examination technique for the shoulder joint is: The supraspinatus outlet projection is a modified scapular Y projection, there is no special preparation, the patient is only asked to remove metal objects that can cause artifacts on the radiograph and the patient is standing. The patient's body rotation is 60°. The central ray is angled 10° and 30° caudally. The result is that the scapular Y view projection , also known as the scapulolateral or trans-scapular view , can be modified by providing an X-ray angle of 0° to 10° caudally (craniocaudal angle) to obtain an optimal lateral view of the scapula . Better visualization of the lateral glenohumeral joint , which is important in the evaluation of conditions such as dislocations, fractures and frozen shoulder.

Radiographic examination of the shoulder joint using the scapular y view method was performed with an oblique PA projection , namely the patient's body position was rotated 45° - 60° to the Image Receptor (IR) with the horizontal Central Ray (CR) perpendicular to the IR (0°). In variations of body rotation of 45° - 60°, the radiograph results obtained were distortion and differences in anatomical information including the location of the coracoid process . It was concluded that the correct body rotation scoring to obtain optimal shoulder joint anatomical information was at 50° body rotation. A good image was produced to evaluate suspected dislocations in the Shoulder Joint (15).

Shoulder joint examinations generally use anteroposterior (AP) neutral rotation, transthoracic lateral, and scapular Y lateral projections. Additional projections include the tangential-supraspinatus outlet projection (Neer method) 10° caudally and the AP oblique axial (Garth method). In the AP projection , the position of the shoulder joint is patient erect in front buckystand, position object, the scapula against in the middle of the Image Receptor (IR) and the arm patient positioned neutral. Upright Straight IR

with central point in the middle scapulohumeral joint. The focal distance to the film used is 100 cm with IR size 24 cm x 30 cm. (5).

MATERIALS & METHODS

Study This use method quantitative descriptive For compare results description scapular Y view two angles ray different that is direction ray 0□and 10° caudally on patient with clinical frozen shoulder . Method This aim For describe and analyze difference quality picture based on the data obtained with do observation and action taking the picture is also accompanied by with questionnaire . Then from results questionnaire taken conclusion . Variables free in study This that is variation direction perpendicular and 10° caudally . While the dependent variable in study This namely the examination technique and results of the scapular Y view radiology image . The control variables are KV, mAs , FFD, Position Patient and Position Object .

Population in the study This is overall patients undergoing Scapular Y view examination of supraspinatus outlet 10° caudally in clinical frozen shoulder in the Radiology Unit of a private hospital in Jakarta with the number of samples was 3 patients. Respondents study is a radiographer and doctor specialist radiology. Instruments used is Digital Radiography (DR) plane , sheet questionnaire, sheet interview, tools recorder and tools documentation . For each research sample, namely patient with clinical frozen shoulder treatment inspection radiography Scapular Y projection, made 2 exposures with direction different rays , where is 0° and 10 °caudally,

Examination results in the form of radiological images will assessed by a doctor specialist radiology in form expertise . Overview of the third sample, then given to respondents For done evaluation . Assessment criteria from number 1 for less , 2 sufficient , 3 good and 4 very good .

Independent Variable	Operational Definition	Tool Measuring	How to Measure	Scale
Technique inspection	Patient erect with body in oblique	Use tool measuring on	Questionnaire	Numeric

scapular Y view PA oblique direction ray 0° Technique inspection scapular Y view PA oblique direction ray 10° caudally.	(RPO) with hand flexed	tube.

Variable Bound	Definition Operational	Tool Measuring	How to Measure	Scale
bound: Results description scapular Y view PA oblique direction ray 0° And 10° caudally.	Results description scapular Y view	Questionnaire	Questionnaire and respondents	Numeric

Table 1 Definition Operational

RESULTS AND DISCUSSION

Sample characteristics in research This is patient with clinical frozen shoulder and divided based on age and type gender. The average age of the sample was range between 30 to 35 years old , with 100% of the sample being male sex male . The youngest sample age in study This 30 years old and the oldest aged 35 years . Based on Table 2 regarding type gender and age of sample

Table 2 Sample Characteristics

Gender	Code	Age (years)	clinical
Man	S1	30	Frozen shoulder
Man	S2	34	Frozen shoulder
Man	S3	35	Frozen shoulder

Table 3 Characteristics Respondents

Gender	Code	Profession	Working Period (years)
Man	R1	Radiographer	4
Woman	R2	Radiographer	9
Man	R3	Radiographer	10
Woman	D1	radiology specialist	2
Man	D2	radiology specialist	4
Man	D3	radiology specialist	11

Respondents in study This there are 6 people consisting of of 3 radiographers and 3 radiology specialist. With each level of education according to with his profession . Experience Work varies with a minimum of 2 years experience work and a maximum of 11 years experience work . Respondent gender group consists of of 2 female respondents and 4 male respondents man .

As for results radiography inspection scapular Y view PA Oblique with direction Central Ray 0° and 10° caudally in clinical frozen shoulder as following

Sample 1

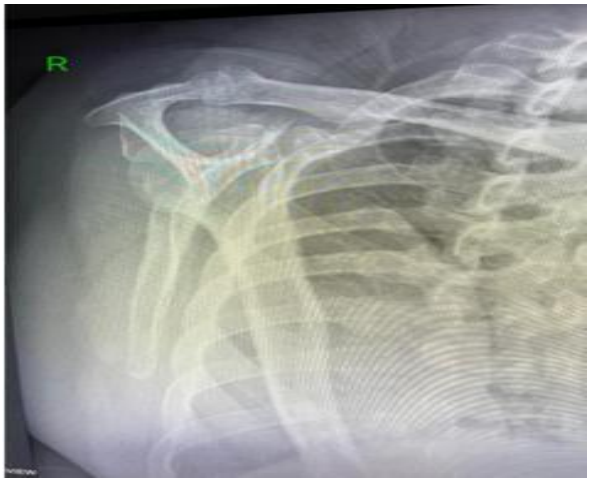


a. Ray direction 0 °

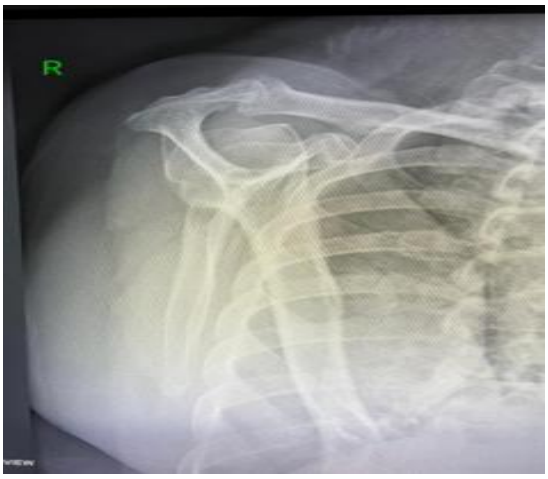


b. Ray direction 10 °Caudally

Sample 2



a. Ray direction 0 °



b. Ray direction 10 °Caudally

Sample 3



a. Ray direction 0°



b. Ray direction 10 °Caudally

On the results radiography with direction ray 0°, relative humerus is at in axis normal to glenoid, no visible shift significant leading to dislocation. Structure scapula, acromion , and coracoid looks intact . Improvement picture density network soft periarticular, is description fibrosis or contracture capsular in case frozen shoulder and joint space glenohumeral visible narrow

Radiographic results Scapular Y examination with direction ray 10 °Caudally, will Position Image View head humerus Still in articulation normal with cavity glenoid, Not visible dislocation . Acromial arch and coracoid visualized more clear compared to 0□projection, giving optimal view of the subacromial outlet. Narrowing light room subacromial, can show existence thickening structure periarticular, according to with description inflammation chronic or capsular fibrosis. Not visible calcification supraspinatus tendon or scapular fracture. Structure other bones are visible intact, density bone within normal limits.

According to results questionnaire, in anatomy of the bones compiler scapular Y obtained results as following ; Structure configuration Scapular Y will looks more clear, in the settings direction ray 10 °caudally, although both of them can showing the scapular image, but in the settings ray upright straight, on the part small glenoid cavity overlapping by other parts of the scapula . For anatomical overview humerus, more good in direction ray 10 °caudally . so also his with the image of the glenoid cavity, because in the direction ray 0°, visualization the resulting glenoid cavity looks narrow, no symmetrical, or closed partly by other structures .

Scapulohumeral joint, In the direction Ray 10° caudally, which shows that projection This capable display interspace joints scapulohumeral very clearly and proportionally . The direction of the beam is 10° caudally help optimize visual separation between head humerus and glenoid scapula, interspace joints seen more open And easy evaluated in the direction ray Tegal straight, tendency overlapping overlap between structure joints or lack of corner proper visualization For expose room joints in a way maximum. For the image of the alignment of the scapula and humerus, in the direction ray 10° caudally, capable display connection linear between scapula and humerus in a way clear and accurate. Projection This give orientation more anatomy in accordance with field scapular, so that allows visualization

alignment Which parallel and symmetrical. In the settings direction ray 0° not enough capable expose alignment scapula And humerus in a way optimal, possibility Because effect overlapping overlap or lack of depth the following projections scapular plane in general experience .

The connection with clinical frozen shoulder, of the two variations studied, evaluation case frozen shoulder, Which marked with limitations room joints and changes structural on network soft in around joints glenohumeral angle caudally by 10° caudally allows projection more light parallel with field scapular, so that reduce superimposition structure bones and clarify visualization important anatomy in the diagnosis of frozen shoulder. in the direction ray 0°, though anatomy Still can visible, quality visualization No optimally direction ray 10° caudally. Direction of light 0° produce overlapping between humerus and scapula structures, which can blur description anatomy important and reduce accuracy interpretation.

CONCLUSION

Based on results research conducted, can concluded that technique inspection radiography scapular Y view PA oblique on clinical frozen shoulder is performed with positioning patient in position standing, facing to direction detector with rotation body around 45°–60° to field projection. Projection This done with two variation direction ray, that is 0° and 10° caudally. The direction central ray is used For get visualization base from configuration scapular “Y”, whereas direction 10° caudally aimed beam For open room supraspinatus outlet to be visible more clear and reduce superimposition structure . The results of the image radiography Scapular Y view PA oblique in clinical frozen shoulder shows that direction ray 0°, 67% of respondents states is good. On direction rays 0°, structure acromion, coracoid, and glenohumeral articulations are lacking clear Because there is overlapping between structure and difficulty in evaluate position head humerus. Imaging results radiography Scapular Y view PA oblique in clinical frozen shoulder shows that direction 10° ray caudally, 100% of respondents state very Good . On direction ray 10° caudally, structure acromion, coracoid, and head humerus looks more clear, as well as room supraspinatus outlet can evaluated with more good . Although frozen shoulder no always show abnormalities primary structural, projection This help evaluate position relatively head humerus as well as change anatomy secondary like

narrowing room subacromial or immobility head humerus. Research results This confirm that use direction ray 10° caudally in scapular Y view PA oblique more recommended Because produce quality a clearer picture Good in a way anatomical and diagnostic compared to with direction central ray 0°.

REFERENCE

1. Aydingöz , Ü., Canbulat , N., & Demirhan, M. (2014). Radiological evaluation of the shoulder region. Turkish Journal of Physical Medicine and Rehabilitation, 60(SUPPL. 1), 68–77
2. Bontrager, K. L., & Lampignano , J. P. (2018). Bontrager's Handbook of Radiographic Positioning and Techniques, eight edition, Elsevier Mosby, 2014
3. Evelyn C. Pearce (2011) Anatomy and Physiology For Paramedic , edition 35th, PT Gramedia Utama Jakarta.
4. Fitriyana , I., Ismunandar , H., Wintoko , R., Hadibrata, E., & Djausal , A. N. (2022). Management Frozen Shoulder. *Medical Profession Journal of Lampung* , *12* (1), 55–60.
5. Kuntono , HP, 2004. *Physiotherapy Aspects of Shoulder Pain Syndrome* in a Complete Analysis of Frozen Shoulder, Surabaya
6. Health Research and Development Agency (Badan Litbangkes). (2018). Report Basic Health Research 2018 National.pdf. In *Institution Publisher Health Research and Development Agency* (p. 674).
7. BAPETEN. (2013). Regulation of the Head of the Nuclear Energy Regulatory Agency Republic *of* Indonesia. *BAPETEN Regulation* , *4th 2013* , 1–29.
8. Bontrager, K. L., & Lampignano , J. P. (2018). *Textbook of Radiographic Positioning and Related Anatomy (E. Mosby (ed.); 9th Edition)*. (Vol. 1, Issue 9).
9. de la Serna, D., Navarro-Ledesma, S., Alayón , F., López, E., & Pruimboom , L. (2021). A Comprehensive View of Frozen Shoulder: A Mystery Syndrome. *Frontiers in Medicine* , *8* (May), 1–10.
10. Duralde , Iannotti, J.P., & Williams, G. R. (2020). *Iannotti, JP, & Williams, G. R. (2020). Shoulder Arthritis and Its Treatment. Elsevier.* Iannotti, J.P., & Williams, G.R.
11. John Barone, MA C. (2016). *Step 1- pathology 2016* . Kaplan, Inc.
12. Ministry of Health of the Republic of Indonesia. (2018). DKI Jakarta Province Report : Riskesdas 2018. In the *Publishing Institute of the Health Research and Development Agency* . https://www.litbang.kemkes.go.id/laporan-riset- basic-health-riskesdas /

13. Neer, C.S. (2018). SRS (2018). *Shoulder Reconstruction. Saunders.* Saunders, Philadelphia, 1990.
14. Prastanti , AD, Wibowo, AS, & Sa'idah , R. (2019). The Effect of Rotation Variations Body To Information Anatomy On Inspection Radiography Shoulder Joint Method Scapular Y View. *Journal Imejing Diagnostic (JImeD)* , *5* (2), 106.
15. Rockwood, C. A., & Green, D. P. (2018). *s.Rockwood , C. A., & Green, D. P. (2018). Fractures in Adults. Lippincott Williams & Wilkins* . Rockwood, CA, & Green, D.P
16. WHO. (2018). *Frozen Shoulder* . *7* , 1–25.