

Apical Approach Pericardiocentesis Compared to Subxiphoid Approach

Samir Gautam,¹ Murari Barakoti,¹ Sachin Dhungel,¹ Bishal KC,¹ Anish Hirachan,¹ Majhar Khan,¹ Umesh Yadav,¹ Abhishesh Shakya,¹ Rajesh Panjiyar,¹ Jeet Prasad Ghimire¹

¹Department of Cardiology, Gautam Buddha Community Heart Hospital, Butwal, Rupandehi, Nepal.

Received: 23th February, 2025

Accepted: 26th May, 2025

Published: 30th June, 2025

ABSTRACT

Background: Very few studies have been done worldwide and no studies in Nepal to compare different approaches to pericardiocentesis. We wanted to evaluate safety and complications of apical approach pericardiocentesis.

Methods: Approach to pericardiocentesis and parameters including complications noted in proforma after getting consent from the patients. This is was cross-sectional observational study. Calculation of parameters done using SPSS 20 version.

Results: Total 100 patients were evaluated with 50 apical approach and 50 subxiphoid approach. Cardiac perforation, shock, hypotension and VPC noted more frequently in subxiphoid approach. No procedural death.

Conclusion: Apical approach pericardiocentesis was associated with fewer complications compared to subxiphoid approach.

Keywords: pericardiocentesis; apical; subxiphoid; Nepal.

INTRODUCTION

Pericardial diseases may be either isolated disease or part of a systemic disease.¹⁻⁵ The main pericardial syndromes that are encountered in clinical practice include pericarditis (acute, subacute, chronic and recurrent), pericardial effusion, cardiac tamponade, constrictive pericarditis and pericardial masses.^{1,4,5} Pericardial effusion may be classified by simple semi quantitative echocardiographic assessment as mild (<10mm), moderate (10–20mm) or large (>20mm).⁶ Many cases remain idiopathic in developed countries (upto50%), while other common causes include cancer (10–25%), infections (15–30%), iatrogenic causes (15–20%) and connective tissue diseases (5–15%) whereas Tuberculosis is the dominant cause in developing countries (60%) where Tuberculosis is endemic.^{7,8}

When a pericardial effusion becomes symptomatic without evidence of inflammation or when empirical anti-inflammatory drugs are not successful, drainage of the effusion should be considered. Pericardiocentesis with prolonged pericardial drainage of up to 30 ml/24h may be considered in order to promote adherence of

pericardial layers and prevent further accumulation of fluid; however, evidence to support this indication is based on case reports, retrospective studies and expert opinion.^{6,9,10} There are studies including case series of apical approach pericardiocentesis¹¹⁻¹². In Nepal there are studies mainly focused in clinical profile and etiology.¹³⁻¹⁵ There is no study comparing apical approach to subxiphoid approach in Nepal. So, we wanted to evaluate the safety of apical approach pericardiocentesis in Nepal comparing with subxiphoid approach.

METHODS

This study was conducted at Gautam Buddha Community Heart Hospital, Rupandehi, Lumbini Province, Nepal. Patients having moderate to large pericardial effusion were selected for study. Those giving consent for study and pericardiocentesis were evaluated with apical approach and subxiphoid approach case by case basis. This was prospective observational study. Demographic data and clinical features were recorded. Findings on investigations including electrocardiography and echocardiography recorded in proforma. Pericardiocentesis fluid details,

Correspondence: Dr. Samir Gautam, Department of Cardiology, Gautam Buddha Community Heart Hospital, Butwal, Rupandehi, Nepal. Email: samirgautam22@gmail.com, Phone: +977-9852047041.

procedural complications and report of fluid analysis noted proforma. Observed findings tabulated and calculation done using SPSS 20 software.

RESULTS

Out of total 100 patients selected for study 50 patients underwent apical approach and 50 patients underwent subxiphoid approach pericardiocentesis. Among the total participants 43% were male and 57% were female. Female patients were more than male patients in both groups (Table 1).

Table 1. Gender distribution.

Gender	Apical Approach	Subxiphoid Approach	Total (No. of patients)
Male	22	21	43
Female	28	29	57
Total	50	50	100

More patients were found in younger age group in Subxiphoid approach compared to Apical approach (Table 2).

Table 2. Age Distribution.

Age (Years)	Apical Approach (%)	Subxiphoid Approach (%)
Less than 45	38	46
45 to 65	42	28
More than 65	20	26

In both categories of patients 500 to 1000 ml pericardial fluid aspiration was more common than the group with more than 1000 ml or less than 500 ml (Table 3).

Table. 3 Amount of pericardial fluid.

Amount (ml)	Apical Approach (%)	Subxiphoid Approach (%)
Less than 500	14	24
500 to 1000	66	46
More than 1000	20	30

Straw color fluid was more common than hemorrhagic fluid in pericardiocentesis (Table 4).

Table 4. Character of pericardial fluid.

Character of fluid	Apical Approach (%)	Subxiphoid Approach (%)
Straw color	60	58
Hemorrhagic	36	40
Purulent	4	2

In our study all the complications were more common in Subxiphoid approach group than Apical approach group. Complications included hypotension, shock, VPCs and myocardial perforation. No death was noted in both groups (Table 5).

Table 5. Complications.

Complications	Apical Approach (%)	Subxiphoid Approach (%)
Hypotension	6	16
Shock	0	4
VPCs	4	12
Perforation	0	6
Death	0	0

DISCUSSION

In this study female patients were more than male in both the groups. This is in contrast to the other studies from Nepal where pericardial effusion was found more commonly in male.¹³⁻¹⁵ More patients were found in younger age group in subxiphoid approach (46%) compared to apical approach (38%). Amount of fluid range 500 to 1000 ml was more common in both the groups. Straw colored fluid was more common in both the groups.

Hypotension was more common in subxiphoid approach (16%) compared to apical approach (6%). Shock was present in 4% cases of subxiphoid approach and absent in apical approach. VPCs were noted in both the groups but it was more common in subxiphoid approach (12%) compared to apical approach (4%). Perforation of myocardium was present in 6% cases of subxiphoid approach and absent in apical approach. Death was absent in both the groups.

This study found that pericardiocentesis done by apical approach was as safe as subxiphoid approach. In this study complications including shock and myocardial perforation were more common in subxiphoid approach. This study establishes the safety of apical approach in Nepalese patients when done with meticulous care in Cardiac centre. So, apical approach can be chosen as frequently as subxiphoid approach. Further study with prespecified safety endpoints is needed to establish

the superiority of apical approach.

CONCLUSIONS

Pericardiocentesis when done with imaging guidance by experienced operators is associated with few complications. Apical approach was found to be as safe as subxiphoid approach and was associated with fewer complications in our study.

Limitation: This study was single center study from

Lumbini province Nepal. Multicenter randomized study will be more representative of safety of the technique. We did not do follow up of the patients to look for delayed complications and long term outcome. We did not take account of etiology of pericardial effusion.

Conflict of interest: None

Funding: None

REFERENCE

1. Maisch B, Seferovic PM, Ristic AD, Erbel R, Rienmuller R, Adler Y et al;TaskForce on the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology. Guidelines on the diagnosis and management of pericardial diseases executive summary. *Eur Heart J* 2004;25:587–610. [DOI]
2. Klein AL ,Abbara S, Agler DA ,Appleton CP ,Asher CR ,Hoit B et al. American Society of Echocardiography clinical recommendations for multimodal ity cardiovascular imaging of patient with pericardial disease: endorsed by the Society for Cardiovascular Magnetic Resonance and Society of Cardiovascular Computed Tomography. *J Am Soc Echocardiogr* 2013;26:965–1012.e15. [DOI]
3. Cosyns B, Plein S, Nihoyanopoulos P, Smiseth O, Achenbach S, Andrade MJ et al. European Association of Cardiovascular Imaging (EACVI) and European Society of Cardiology Working Group (ESCWG) on Myocardial and Pericardial diseases. European Association of Cardiovascular Imaging (EACVI) position paper: multimodality imaging in pericardial disease. *Eur Heart J Cardiovasc Imaging* 2014;16:12–31.[DOI]
4. Imazio M. Contemporary management of pericardial diseases. *Curr Op in Cardiol* 2012; 27:308–317. [DOI]
5. Imazio M, Gaita F. Diagnosis and treatment of pericarditis. *Heart* 2015;101: 1159–1168. [DOI]
6. Imazio M, Adler Y. Management of pericardial effusion. *Eur Heart J* 2013;34: 1186–1197. [DOI]
7. Mayosi BM. Contemporary trends in the epidemiology and management of cardiomyopathy and pericarditis in sub-Saharan Africa. *Heart* 2007; 93:1176–1183. [DOI]
8. Mayosi BM, Burgess LJ, Doubell AF. Tuberculous pericarditis. *Circulation* 2005;112: 3608–3616. [DOI]
9. Imazio M, Mayosi BM, Brucato A, Markel G, Trincherio R, Spodick DH et al. Triage and management of pericardial effusion. *J Cardiovasc Med (Hagerstown)* 2010; 11:928–935. [DOI]
10. Ristic AD, Imazio M, Adler Y, Anastasakis A, Badano LP, Brucato A et al. Triage strategy for urgent management of cardiac tamponade: a position statement of the European Society of Cardiology Working Group on Myocardial and Pericardial Diseases. *Eur Heart J* 2014; 35:2279–2284. [DOI]
11. Hasan O, Vedat D, Musa C, Adnan D, Ibrahim S, Mustafa O et al. Echocardiography-guided pericardiocentesis with the apical approach. *Arch Turk Soc Cardiol* 2009;37(3):177-181. [PMID]
12. Alaiwah M, Hassanin A, Abbasi D, Rayes H, Hassan Z, Albadaineh M et al. Percutaneous pericardiocentesis using the apical approach: case series and review of the literature. *The Egyptian Heart Journal* (2024) 76; 106.[DOI]
13. Neupane KR, Simkhada R, Manandhar R et al. Clinical profile of patients admitted with pericardial effusion in Shahid Gangalal National Heart Centre, Kathmandu, Nepal. *Nepalese Heart Journal* 2023; Vol 20(1), 35-38.[DOI]
14. Gupta M, Prasad M, Lal A, Mishra J, Ali I,

Bhatta P, Khadka S. Clinical Profile and Etiology of Patients with Pericardial Effusion. JNHLS. 2023; 2(2):97-102.[DOI]

15. Khanal R.R, Gajurel RM, Sahi R, Shrestha H, Poudel CM, Devkota S et al. (2019) Study of

Etiological Profile, Clinical Profile and Short Term Outcome of Patients Presenting with Pericardial Effusion in a Tertiary Care Center, Nepal. World Journal of Cardiovascular Diseases 2019 (9); 879-890. [DOI]

Citation: Gautam S, Barakoti M, Dhungel S, KC B, Hirachan A, Khan M, Yadav U, Shakya A, Panjiyar R, Ghimire JP. Apical Approach Pericardiocentesis Compared to Subxiphoid Approach. JNHLS. 2025; 4(1):12-15