ISSN: 2347-6567

International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

IJPAR |Vol.14 | Issue 4 | Oct - Dec -2025

www.ijamscr.com

DOI : https://doi.org/10.61096/ijpar.v14.iss4.2025.792-806

Research

A CASE SERIES ON ANASARCA AS A CLINICAL MANIFESTATIONS OF CHRONIC KIDNEY, LIVER AND HEART DISEASES

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Published on: 27 Nov 2025

Published by:
Futuristic Publications

Abstract

Anasarca is a condition characterized by severe generalized swelling of the body following accumulated of fluid in the extracellular compartments, It may result from multiple etiology mainly of renal, hepatic, cardiovascular origin and nephrotic syndrome that change the proteins of the body, affect the balance of fluids or create abnormalities in the blood vessels or lymphatic system. This is a case report of anasarca with chronic kidney disease of which 60 year old male patient was admitted in hospital with chief complaints of bilateral lower limb swelling, facial puffiness and abdominal discomfort and distension since 1 month, Patient also had a whole body swelling, breathlessness, orthopnea, cough since 15 days with decreased urine output. So based on patient signs and symptoms. The physician has advised complete blood count, lipid profile test, serum protein, renal function test, liver function test, urine analysis, abdomen pelvic sonography etc, In which CBC, RFT, urine analysis, serum proteins were abnormal. Abdomen pelvic sonography shows left kidney not visualized atrophy, right grade 1 renal parenchymal disease, moderate ascites with bilateral pleural effusion, chronic liver disease and confirmed final diagnosis as anasarca with chronic kidney disease. The treatment was initiated with symptomatic treatment along with first line therapy includes diuretics, iron folic acid, sodium bicarbonates, amlodipine, antiemetic, proton pump inhibitors, vitamin supplements, antibiotics etc. Due to atrophy (failure) of one kidney, patient was advised for dialysis and patient counselling was given. Early identification and treatment of the patient is important and it will lead to better outcomes and hopefully decrease the need for prolonged hospitalization, prevention steps for anasarca by managing the conditions that can cause it and following the physician instructions carefully for changing daily habits and taking medications correctly.

Keywords: Anasarca, Renal, Hepatic, Cardiovascular, Chronic Kidney Disease (CKD), Ascites, Pleural effusion, Renal function test (RFT), Diuretics and Prevention.

INTRODUCTION

Anasarca is a severe edema characterized by generalized whole body swelling which resulted from marketed retention of extracellular fluid in the interstitium and the potential space.[1] It has been reported to result when systemic condition distrupt the equilibrium between oncotic and hydrostatic pressure gradients across capillarys , it leads to decreased plasma oncotic pressure, increased capillary hydrostatic pressure, and increased capillary permeability.[2] It is caused by proteinuria, low synthesis state, gastroenteral protein loss.[3] Anasarca is a symptom rather a disease due to any condition that involves capillary filtration depositing fluid into tissues faster than lymphatic drainage can remove it.[4]

Anasarca vs Edema

Anasarca is type of edema, but not all edema is anasarca .Due to removal of lymph nodes localized edema occurs in one or both lower legs or in an arm. Symptoms of localized edema can be improved by elevating the affected body part above the level of the heart, whereas in case of anasarca ,it is generalized edema, here edema exist above the level of the heart, and changes in body position do not relieve it.[4]

EPIDEMIOLOGY

Research on the precise occurrence of anasarca is quite scarce. Peripheral edema, a more commonly observed clinical condition, is estimated to affect roughly 20% of adults aged over 50 years. In contrast, one study reported that the incidence of anasarca in postoperative patients undergoing abdominal surgery was approximately 29.87%. Another study found similar rates among postoperative patients, with an incidence ranging from 25% to 30%.[5]

ETIOLOGY[6]

1.	Edema of heart failure
2.	Edema of renal ● acute or chronic renal failure ● nephrotic syndrome
3.	Edema of hepatic ● hepatic failure ● cirrhosis
4.	edema of nutritional origin
5.	malnutrition
6.	lymphatic or venous obstruction
7.	protein losing enteropathy
8.	drug induced such as prednisolone, estrogen, and vasodilators
9.	thyroid disorders ● hypothyroidism ● hyperthyroidism

Figure 1: Images showing whole body swelling

CLINICAL MANIFESTATIONS

- Puffiness of face
- Pedal edema(pitting or non pitting)
- Weight gain[7]
- Generalized whole body swelling
- Failure of multiple organs
- Changes in heart rate
- Fluid around lungs
- Swelling often causes additional symptoms includes [8]

1. Trouble walking if legs are swollen
2. Difficult lifting arm
3. Aching joints
4. Difficult breathing

RISK FACTORS[5]

- Heart failure
- Kidney failure
- Liver disease
- Malnutrition
- Medications like NSAIDS, Corticosteroids.
- Endcrionpathies eg : Hypothyroidism
- Collagenopathies eg : SLE,Dermatomyositis
- Protein losing enteropathy eg : Celiac disease

PATHOPHYSIOLOGY[6]

1. Increased capillary hydrostatic pressure: this causes more water to be driven outwards in the interstitial space, This leads to the depletion of intravascular volume, as a result it activates the renin angiotensin aldosterone vasopressin system, leads to renal sodium retention, this condition occur most commonly in renal disease, heart failure, liver cirrhosis and increased renal sodium retention is primary cause of fluid overload and edema.
2. Increased capillary permeability: it occurs due to release of chemical mediators, plasma protein leave the circulation and draws more water in the interstitial space.it normally occurs in infection, inflammation to the capillary walls.
3. Decreased plasma oncotic pressure: it occurs due to depletion of plasma protein.

4. Lymphatic Obstruction: lymphatic system plays a main role removing the protein and white blood cells from the interstitium. But when lymphatic obstruction occurs then it allows the substances to accumulate in the interstitium.

DIAGNOSIS

It mainly includes the medical history and physical exam.

1. Blood Test: to check the function of organ includes liver, renal, lungs etc.
2. ECG
3. Echocardiography
   - To confirm heart failure
   - To detect pericardial effusion
4. Chest x ray
5. Prothrombin Time[6]
6. Medical History : To determine whether any medical history condition are causing the fluid retention.[8]
7. CT Scan
8. MRI Scan
9. Thyroid Study
10. Urine Analysis

COMPLICATION[6]

1. Skin ulcerations
2. Skin infections
3. Dyspnea
4. Congestive heart failure
5. Death

TREATMENT

NON PHARMACOLOGICAL TREATMENT [6] .

1. Dash therapy
2. Reduce the sodium intake.
3. Consume fresh fruits and vegetables.
4. Reduce consumption of protein intake.
5. Manage weight as per BMI.
6. Exercise regularly such as walking, jogging and aerobic exercise.
7. Better medication adherence.
8. Regular checkups.
9. Dialysis when indicated**.**

PHARMACOLOGICAL THERAPY

1. **DIURETIC:** It includes loop and potassium sparing diurectics, These helps the kidney to release more salt into the urine, which leads to the release of more fluid through urination. Dose and route of administration of diuretic depends on the severity of the swelling and underlying condition that is causing ansarca.[8]
2. **ALBUMIN :** it a protein made by the body, it has many variety of function, including balancing fluid. The level of albumin can become too low in some certain serious medical condition and poor nutrition, This problem can be corrected by replacing albumin.[8]

CASE PRESENTATION 1

A 60 Years old male patient was admitted to the general medicine ward at BMCRC Ballari(Karnataka) with the chief complaints of bilateral lower limb swelling, facial puffiness and abdominal discomfort and distension since 1 month. The patient also had a whole body swelling which increased in the morning and gradually decreasing as the day pass, he also complaints of breathlessness and history of Orthopnea and cough since 15 days with decreased urine output. The vitals were checked and Blood pressure was slightly high (140/90), Anterior edema was presented.

THE LABORATORY INVESTIGATIONS

- Blood tests were done which revealed that decreased in Red blood cells, Hemoglobin, total protein, albumin, globulin, A/G ratio, bilirubin unconjugated and increase in serum creatinine, blood urea, chloride.

- ✦ Urine Analysis resulted in 2-6 plus cells ,2-4 EPC cells with sugar and albumin presence.
- ✦ ELECTROCARDIOGRAPH revealed that low voltage complex, sinus rhythm.
- ✦ CHEST X RAY revealed increased Broncho vascular markings
- ✦ ABDOMINAL-PELVIC SONOGRAM REPORTED

Chronic liver disease
Left kidney atrophy
Right kidney grade I renal parenchymal disease Moderate ascites and B/L pleural effusion.
The final diagnosis was confirmed as “Anasarca with chronic kidney disease”.

A **B** **C** **D**

Figure 2: Images showing the generalized whole body swelling in the patient

LABORATORY PARAMETERS:

PARAMETERS	RESULTS		REFERENCE RANGE
	19/3/24	**22/3/24**	
HEMATOLOGY Hemoglobin (Hb)	**8.5**	**9.7**	14 - 18 g/dl (Male)
Red Blood Cells (RBC)	**3.31**	**3.33**	4.3 - 5.9 x 10°/mm (Male)
MPV	9.2	10.4	7-11fL
PCV	**27.1**	**28.4**	45-55%
Mean cell volume (MCV)	82.1	85.4	76 - 100 fl
Mean cell Hb (MCH)	**25.7**	29.1	27-33 pg/cell
Mean cell Hb Conc. (MCHC)	**31.3**	34.1	33 - 37 g/dl
WBC - Total Count (TC)	6470	7010	4500 - 11,000 cells/cumm
Polymorphs (N)	73	60	40 - 75%

Lymphocytes (L)	20	33	20 - 50%
Eosinophils (E)	3	3	1 - 6%
Platelets (Plt)	2.31	2.10	1.5 - 4.5 lacs/cumm
BIOCHEMISTRY Fasting blood sugar	**101**		<100 mg/dl
ELECTROLYTES Sodium	142		135 - 145 mEq/L
Potassium	5.0		3.5 - 5.0 mEq/L
Chloride	**116**		97 - 107 mEq/L
Total Calcium		**8.0**	8.6-10.2mg/dl
LIPID PROFILE Total. Cholesterol		157	200 mg/dI
Triglycerides		39	<160 mg/dl
Low-density lipoprotein (LDL)		102	<130 mg/dl
High-density lipoprotein (HDL)		41	<45 mg/dl
Very low density lipoprotein(VLDL)		8	<20 mg/dI
LDL/HDL RATIO		2.5	

RENAL PROFILE Serum Creatinine (S.Cr)	**4.9**		0.6 - 1.2 mg/dl
Blood Urea Nitrogen (BUN)	**63**		8 - 18 mg/dl
OTHERS			
Total protein	**4.9**		6-8.3g/dl
Albumin	**2.5**		3.2-5.4g/dl
Globulin	**2.4**		2.5-3g/dl
A/G RATIO	**1.0**		1.2-1.5

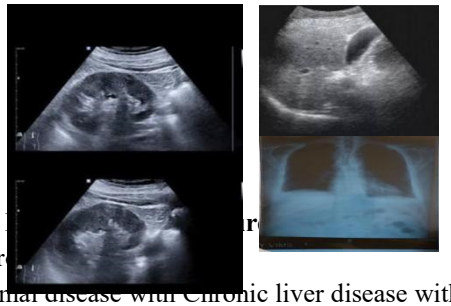
LIVER FUNCTION TESTS			
Aspartate Aminotransferase(AST)	15		0 - 35 U/L
Alanine Aminotransferase(ALT)	13		0 - 35 U/L
Alkaline Phosphatase (ALP)	97		30 - 120 U/L
Total Bilirubin	0.2		0.1 - 1 mg/dl
Direct Bilirubin	0.1		0 - 0.2 mg/dI
Indirect Bilirubin	0.1		0.1 - 0.8 mg/dl
URINE ANALYSIS			
Urine Sugar	0.5 %		
Urine Albumin	2+		
Urine microscopy	2 to 6 pus cells to 4 EPC cells		
URINE			
SPOT PROTEINS	284.1mgs%		
SPOT CREATININE	34.7mgs%		
PROTEIN/CREATININE RATIO	8.1		

ABDOMEN PELVIC SONOGRAPHY REPORT:

IMPRESSION

- Chronic liver disease
- Left kidney not visualized-atropy/ectopic
- Right grade 1 renal parenchymal disease
- Moderate ascites with B/L pleural effusion.

Cirrhosis condition leads to portal hypertension which increases the hydrostatic pressure in the splanchnic circulation, reduced Protein synthesis by the liver leading to the increase in the oncotic pressure, Raaz activation due to effective circulating volume which finally leads to the chronic conditions such as fluid retention and finally to the anasarca(9)



A. Left kidney not visualized-atr
B. Right grade 1 renal parenchymal disease with Chronic liver disease with moderate ascites
C. Chronic liver disease D.B/L Pleural effusion

PHARMACOLOGICAL THERAPY

SL NO	NAME OF THE DRUG	FREQUENCY	ROUTE	DOSE	DAYS
1	INJ CEFTRIAXONE	1-0-1	IV	1g	D1 –D6
2	INJ PANTOPRAZOLE	1-0-0	IV	40mg	D1-D6
3	INJ FUROSEMIDE	1-1-0	IV	40mg	D1-D6
4	INJ ONDANSETRON	S0S	IV	4mg	D1-D3
5	Tab IRON FOLIC ACID	1-0-1	PO	333mg	D1-D6
6	Tab B-COMPLEX	1-0-0	PO		D1-D6
7	INJ SODIUM BICARBONATE	1-1-1	IV	10ml in 100ml	D1-D6
8	Tab AMLODIPINE	1-0-1	PO	5mg	D1-D6

DISCHARGE MEDICATION

SL NO	NAME OF DRUG	FREQUENCY	ROUTE	DOSE
1.	Tab pantoprazole	1-0-0	PO	40 mg
2..	Tab furosemide	1-1-0	PO	40 mg
3.	Tab Iron folic acid	1-0-1	PO	333mg
4.	Tab B complex	1-0-0	PO	
5.	Tab sodium bicarbonate	1-1-1	PO	500mg
6.	Tab amlodipine	1-0-1	PO	5mg
7.	Tab cefixime	1-0-1	PO	400mg

CASE PRESENTATION 2

A 30 Years old male patient was admitted to the general medicine ward at BMCRC Ballari(Karnataka) with the chief complaints of swelling of lower limb since one month, complaints of distension of abdomen since one month, complaints of breathlessness since 15 days. Patient is alcoholic since 20 years last drink was one month back. In PICCLE examination edema was positive, The vitals were checked and Blood pressure was slightly high (140/90), pulse rate is 108 bpm,SPO2 is 98%, GRBS was 104 ug/dl..

THE LABORATORY INVESTIGATIONS

The blood tests were done which revealed that decreased in Red blood cells, Hemoglobin, total protein ,total protein, albumin, A/G ratio, and increase in renal function test and liver function test.

- Urine Analysis resulted in 4 -5 pus cells.
- ELECTROCARDIOGRAPH revealed that tachycardia P wave inverted, LVH.
- ARTERIAL DOPPLER STUDY OF RIGHT LOWER LIMB
- Diffuse mild atherosclerotic changes in bilateral lower limb arteries.
- CHESTXRAY revealed that haziness in left lower zone.
- 2 D ECHO : All four chambers were dilated: global LV hypokinesia. Global LV systolic dysfunction: mild pericardial effusion Fair RV function.
- ABDOMINAL-PELVIC SONOGRAM REPORTED

✓ Grade ll renalparenchymaldisease

✓ Dilated IVC, hepatic veins with bilateral pleural effusion and ascites- likely due to CCF.

Thefinal diagnosis was confirmed as **ANASARCA DUE TO DILATED CARDIOMYOPATHY, LOWER LOBE PNEUMONIA AND ACUTE ON CHRONIC KIDNEY DISEASE.**

LABORATORY PARAMETERS

PARAMETERS	RESULTS	REFERENCE RANGE
HEMATOLOGY Hemoglobin (Hb)	9.8	14 - 18 g/dl (Male)
Red Blood Cells (RBC)	4.38	4.3 - 5.9 x 10°/mm (Male)
WBC - Total Count (TC)	7220	4500 -11,000cells/cumm
Polymorphs (N)	65	40-75%
Lymphocytes (L)	28	20 - 50%
Platelets (Plt)	2.42	1.5 - 4.5 lacs/cumm
BIOCHEMISTRY Random blood sugar	50	70-140mg/dl

ELECTROLYTES Sodium	136	135 - 145 mEq/L
Potassium	4.3	3.5 - 5.0 mEq/L
Chloride	107	97 - 107 mEq/L
RENAL PROFILE Serum Creatinine (S.Cr)	3.2	0.6 - 1.2 mg/dl
Blood Urea Nitrogen (BUN)	61	8 - 18 mg/dl
OTHERS		
Total protein	4.3	6-8.3g/dl
Albumin	1.8	3.2-5.4g/dl
Globulin	2.3	2.5-3g/dl
LIVER FUNCTION TESTS Aspartate Aminotransferase(AST)	110	0 - 35 U/L
Alanine Aminotransferase(ALT)	30	0 - 35 U/L
Alkaline Phosphatase (ALP)	113	30 - 120 U/L
Total Bilirubin	1.0	0.1 - 1 mg/dl
Direct Bilirubin	0.5	0 - 0.2 mg/dI
Indirect Bilirubin	0.5	0.1 - 0.8 mg/dl
BIOCHEMISTRY Urine protein-creatinine ratio	618	10-150mg/g
Troponin T	95.94	0-14pg/mL

PHARMACOLOGICAL THERAPY:

SL NO	NAME OF THE DRUG	DOSE	ROUTE	FREQUENCY
1	INJ CEFTRIAXONE	1g	IV	1-0-1
2	INJ PANTOPRAZOLE	40 mg	IV	1-0-0
3	INJ FUROSEMIDE	40mg	IV	1-1-0
4	TAB ATORVASTATIN	40mg	PO	0-0-1
5	TAB AZITHROMYCIN	500mg	PO	1-0-0
6	TAB METOPROLOL	12.5mg	PO	1-0-0
7	TAB TORSEMIDE	100mg	PO	1-1-0
8	NEB ASTHALIN		NEB	1-1-1-1
9	INJ THAIMINE	200mg in 50 ml NS	IV	1-1-1
10	TAB ALDACTONE	50mg	PO	1-1-0
11	TAB AMOXICLAV	1.2g	PO	1-0-1
12	TAB TRAMADOL	50mg	PO	1-0-1

DISCHARGE MEDICATIONS

SLNO	NAME OF THE DRUG	DOSE	ROUTE	FREQUENCY
1	TAB CEFIXIME	200mg	PO	1-0-1
2	TAB PANTOPRAZOLE	40mg	PO	1-0-0
3	TAB FUROSEMIDE	40mg	PO	1-0-0
4	TAB IRON FOLIC ACID	333mg	PO	1-0-0
5	TAB VITAMIN BCOMPLEX		PO	0-1-0
6	TAB ATORVASTATIN	40mg	PO	0-0-1

CASE PRESENTATION 3:

A 40 years old male patient was admitted to the general medicine ward at BMCRC Ballari(Karnataka) with the chief complaints of breathlessness since one month, c/o generalized body swelling since one week, c/o dry cough since one week, he as the decreased urine output.

The vitals were checked and Blood pressure was slightly high (140/60),pulse rate was 80 bpm,spo2 was 98%,GRBS was 101 mg /dl.

THE LABORATORY INVESTIGATIONS

- Blood tests were done which revealed that decreased in Red blood cells, Hemoglobin, total protein, albumin, globulin and increase in liver function test.
- ELECTROCARDIOGRAPH : NSR low voltage complexes.
- CHEST X RAY : Normal.
- ABDOMINAL-PELVIC SONOGRAM REPORTED
  - Chronic liver disease
  - Moderate ascites and B/L pleural effusion.

The final diagnosis was confirmed as ANASARCA DUE TO CHRONIC LIVER DISEASE.

LABORATORY PARAMETERS

PARAMETERS	RESULTS	REFERENCE RANGE
HEMATOLOGY Hemoglobin (Hb)	**10.7**	14 - 18 g/dl (Male)
Red Blood Cells (RBC)	**3.7**	4.3 - 5.9 x 10°/mm (Male)
WBC - Total Count (TC)	**13070**	4500 - 11,000 cells/cumm
Polymorphs (N)	**79**	40-75%
Lymphocytes (L)	**11**	20 - 50%
Platelets (Plt)	3.21	1.5 - 4.5 lacs/cumm
BIOCHEMISTRY Fasting blood sugar	**186**	<100 mg/dl
ELECTROLYTES Sodium	144	135 - 145 mEq/L
Potassium	4.5	3.5 - 5.0 mEq/L
Chloride	**110**	97 - 107 mEq/L
RENAL PROFILE Serum Creatinine (S.Cr)	**0.5**	0.6 - 1.2 mg/dl
Blood Urea Nitrogen (BUN)	16	8 - 18 mg/dl
OTHERS		
Total protein	**4.9**	6-8.3g/dl
Albumin	**2.6**	3.2-5.4g/dl

Globulin	**2.4**	2.5-3g/dl
LIVER FUNCTION TEST		
Aspartate Aminotransferase(AST)	55	0 - 35 U/L
Alanine Aminotransferase (ALT)	77	0 - 35 U/L
Alkaline Phosphatase (ALP)	116	30 - 120 U/L
Total Bilirubin	0.8	0.1 - 1 mg/dl
Direct Bilirubin	0.3	0 - 0.2 mg/dI

PHARMACOLOGICAL THERAPY :

SL NO	NAME OF THE DRUG	DOSE	ROUTE	FREQUENCY
1.	INJ FUROSEMIDE	20 mg	IV	1-1-0
2.	INJ PANTOPRAZOLE	40mg	IV	1-0-0
3.	INJ CEFTRIAXONE	1g	IV	1-0-1
4.	TAB AMLODIPINE	5mg	PO	1-0-0
5.	INJ ONDANSETRON	4mg	IV	1-1-1
6.	TAB UDILIV	300mg	PO	1-1-1
7.	INJ THIAMINE	100mg	IV	1-1-1
8.	SYRUP LACTULOSE	10ml	PO	1-0-1
9.	TAB THRONORM	62.5mg	PO	1-0-0

DISCHARGE MEDICATION

SL NO	NAME OF DRUG	DOSE	ROUTE	FREQUENCY
1.	TAB PANTOPRAZOLE	40 mg	PO	1-0-0
2..	TAB FUROSEMIDE	40 mg	PO	1-1-0
3.	TAB IRON FOLOC ACID	333mg	PO	1-0-1
4.	TAB B COMPLEX		PO	1-0-0

5.	TAB THROXINE	62.5mg	PO	1-0-0
6.	TAB AMLODIPINE	5mg	PO	1-0-1
7.	TAB UDILIV	300mg	PO	1-0-1
8.	SYRUP LACTULOSE	15ml	PO	1-1-1

DISCUSSIONS

Anasarca is a type of edema that can be caused mainly due to the dis functioning of three organs. Heart, kidney and liver failure or abnormal functioning of these three organs lead to the fluid accumulation by various mechanisms and finally leading to the or causing and anasarca that is whole body edema. Cardiac cause or heart failure
Heart failure leads to increase in the Venous pressure and increased capillary hydrostatic pressure leading to fluid accumulation or fluid leakage into the interstitial spaces which finally leads to another circle additional factor such as decreased cardiac output and decreased renal perfusion activate RAAS system that finally leads to sodium and water retention in the body

Kidney disease or renal failure
Hypoalbuminemia condition is loss of protein, which decrease the oncotic pressure and enhances the fluid accumulation into the interstitial spaces. Additional factors such as, sodium and water retention due to failure in the excretion by the kidneys**.**

Hepatic cause or liver failure
Cirrhosis condition leads to portal hypertension which increases the hydrostatic pressure in the splanchnic circulation, reduced Protein synthesis by the liver leading to the increase in the oncotic pressure, Raaz activation due to effective circulating volume which finally leads to the chronic conditions such as fluid retention and finally to the anasarca(9)
Here is case series in which there are three different cases with three different etiology, one with chronic kidney disease , one with chronic liver disease and one with heart disease. First line treatment includes an edema reducing agent, hence Furosemide was prescribed along with this symptomatic treatment and for treating intercurrent illness. Patient has been counselled about disease ,drug and life style modification that could enhance for managing the disease and intercurrent illness. DASH therapy, reduce the sodium intake , alcohol abstinence, consume fresh fruits and vegetables, reduce consumption of protein intake, manage weight as per BMI, exercise regularly along with better medication adherence, regular checkups.

CONCLUSION

Anasarca is not a disease itself but it is a symptom of underlying condition. Anasarca can be reversible symptom if the etiological factors can be treated effectively. Anasarca is a rare presentation but it is important for clinicians to recognize this manifestations of the disease. Early identifications and treatment of the patient is important and it will lead to significantly better outcomes and hopefully decrease the need for prolonged hospitalization and ICU level care. The prevention steps for anasarca by managing the conditions that can cause it and following the physician instructions carefully for changing daily habits and taking medications correctly.

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