

Acute Renal Infarction; Case Series from Single Institution

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ABSTRACT Acute renal infarct is a rare disease with underlying pathology of complete or partial occlusion of renal vessels. Most of the time this diagnosis can be missed or confused with other more common disorders of kidney. Abdominal tomography is the leading diagnostic workup for accurate diagnosis but on the other hand lactate dehydrogenase can be a marker for diagnosis and treatment follow up. Transesophageal echocardiogram is also a very important imaging that needs to be done for possible paradoxical embolism on these patients. Under good medical care this phenomenon has good prognosis but underlying etiology can contribute to prognosis itself. We aimed to present a case series of 12 patients of acute renal infarct with their clinical symptoms, laboratory findings and imaging studies between 2013-2015.

Keywords: Acute kidney injury; embolism

Renal infarct (RI) is a clinical diagnosis with either partial or complete obstruction of renal blood flow. Most cases present at old age accompanied with atherosclerosis or thromboembolism. Other risk factors for RI include atrial fibrillation, valvular or ischemic heart disease, endocarditis, hyper-coagulation disorders and hematologic disease.^{1,2}

There are a couple of mostly multi-centric case series presented prior to our study from single case to 94 cases between 1978 and 2013. Most of them mentioned about the symptoms and laboratory values they present to emergency department (ED) also confirming computerized tomography (CT) is the best way to reach a definite diagnosis which is really hard to get.³⁻⁶ We aimed to present our results of 12 patients between 2013-2015 from single institution.

CASE REPORTS

This is a retrospective study done between 2013 to 2015 with 12 patients hospitalized because of RI in Bezmiâlem Vakıf University Hospital. All patients initially presented to ED and their CT scan were obtained prior to their hospitalisation. Patients underwent trans-oesophageal echocardiogram (TEE) to demonstrate the pathological findings of cardiac anatomy. All patient records, laboratory values scanned in detail to understand the possible reasons lying beneath this silent disease which is mostly underdiagnosed.

All patients diagnosed with RI admitted to hospital and initiated a therapeutic dose of enoxaparin sodium. Only one patient with left total occlusion underwent primary intervention with balloon dilatation for vascular patency. Patients were discharged following alleviation of their initial lab-

oratory results and achieving a stable dose of warfarin. None of the patients needed to begin dialysis treatment for acute renal failure.

SPSS v.23 (IBM co.) was used for statistical analyses. Students t test and chi-square tests were used where appropriate. P value <0.05 is considered significant.

Prevalence of RI in all patients admitted to nephrology clinic is 0.003% between 2013 and 2015. Seven out of 12 patients were women. Mean age of patients was 54.25 years. Only one patient had diabetes mellitus, 3 had hypertension and also 3 patient had atrial fibrillation as systemic diseases on their past medical history (Table 1). Initial laboratory findings are presented in detail on Table 2.

Comparison between female and male patients mean creatinine values, which were 0.9 mg/dl and 1.60 mg/dl respectively, showed significant difference which can be attributed to muscle mass difference between genders. This concept is also backed up by the eGFR values of genders which found to have no difference in between. Laboratory findings of admission and discharge times and their comparisons are displayed in Table 3.

All patients presented to ED with flank pain of which CT scan was normal for one patient (8.3%), right renal artery occlusion for one patient (8.3%), left sided occlusion for six (50%) and bilateral occlusion for four patients (33.3%). TEE was performed to all patients revealing normal cardiac anatomy on ten out of twelve patients (83.3%) and remaining two had patent foramen ovale (PFO).

We observed a distinct difference between initial lactate dehydrogenase values and values before discharge but the patient count was not big enough for a statistical significance.

DISCUSSION

Prevalence of RI in different countries such as France and Japan found to be 0.009% and 0.013% respectively in one study.⁴ These values are slightly more than what we found in our study as 0.003%. Misdiagnosing RI as nephrolithiasis can be one of the reasons for lower prevalence. All of our pa-

tients presented with acute flank pain and as it can be predicted as flank pain is the most common symptom patients do have. CT scan is widely used for setting up a correct diagnosis as the status of vessels and renal parenchyma can easily be seen also being a non-invasive method makes it the primary choice for imaging.^{6,7}

Etiology of RI in our patients leading cause is cardiac origin. It is not different from literature. In a Korean large case series etiology of RI were 98,7% cardiac reason.⁸ Foramen ovale and paradoxical embolism is one of the best described reasons for RI.⁹ Two of our patients had paradoxical embolism as well and we think that clinicians are obliged to make a cardiac imaging preferably with TEE to better diagnose the problem without losing time. Lactate dehydrogenase (LDH) is another biochemical value that is found to be elevated in different studies.¹⁰ We observed decreasing values of LDH as well but our study population was not big enough to get a statistical significance. We think that following up LDH values from the initial treatment phase to the day of discharge can give a good impression of how the treatment works for patient. This hypothesis is also backed up by the significant lowering of the white blood cells (WBC's) showing decreased inflammation process in relevant time frame. Even though we did not mention our patients' thrombophilia and vasculitis screening results on their arrival, we found that not even a single one had a positive result on such tests as anticardiolipine, anti-beta 2 glycoprotein, C-ANCA, P-ANCA, factor V leiden mutation and antithrombin.

Anticoagulant therapy initiation with enoxaparin seems feasible as there are other surgical approaches defined in literature.⁵ Enoxaparin is easy to use and relatively fast reacting than warfarin sodium makes it valuable in most cases. We used enoxaparin to all patients and slowly changed to warfarin sodium with a transition phase of monitoring blood levels of international normalised ratio.

CONCLUSION

RI is an extremely rare case to come across in normal clinical practise. It is important to think about

TABLE 1: Patients characteristic properties and chronic systemic diseases gathered in one table.

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10	Patient 11	Patient 12
Gender	F	M	M	M	F	M	F	F	M	F	F	F
Age (year)	28	52	39	70	57	72	52	68	40	59	47	67
Diabetes Mellitus	Absent	Absent	Absent	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent	Absent
Hypertension	Absent	Absent	Absent	Absent	Absent	Absent	Present	Present	Absent	Absent	Absent	Present
Dyslipidemia	Absent	Absent	Absent	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent	Absent
Ischemic Cardiac Disease	Absent	Absent	Absent	Present	Absent	Present	Absent	Absent	Absent	Absent	Absent	Absent
Atrial Fibrillation	Absent	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Present	Present
Prior Thromboembolic Event	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Smoking	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Use of Aspirin	Absent	Absent	Absent	Present	Absent	Present	Present	Absent	Absent	Absent	Absent	Absent

TABLE 2: Symptoms and laboratory values of patients at initial evaluation in detail.

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10	Patient 11	Patient 12
Abdominal Pain	Present	Present	Present	Present	Present	Present	Present	Present	Present	Present	Absent	Present
Body Temperature (°C)	36,6	36,8	36,8	36,5	36,3	37,8	36,3	36,7	36,9	36,8	36,5	36,3
Blood Pressure (mmHg)	120/70	120/80	120/80	120/80	110/70	120/80	115/75	130/70	130/65	130/80	120/80	110/70
Laterality of Renal Disease	bilateral	right	left	Left	Bilateral	right	bilateral	Left	Left	Left	Bilateral	left
Lactate Dehydrogenase (U/L)	1037	376	772	425	1678	666	620	1020	354	2365	300	273
C-Reactive Protein (mg/dl)	3,6	2,5	1,1	1,7	2,8	12,5	2,6	5,5	2,1	37,8	0,9	0,5
White Blood Cells (103/uL)	18680	13020	15400	8400	26000	7490	16200	11400	18000	19900	6400	9240
Creatinine (mg/dl)	0,7	1,4	0,8	0,8	0,8	4,2	1,1	0,9	0,8	1,1	0,9	0,8
Hematuria	present	trace	trace	present	present	present	absent	present	absent	absent	absent	absent
Proteinuria	absent	absent	absent	present	present	absent	trace	trace	absent	absent	absent	absent

RI in the differential diagnosis not to make a mistake. The use of CT can effectively lead the way to the diagnosis of RI. TEE should be a part of infarct work-up especially in unknown etiologies.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or

TABLE 3: Initial and discharging laboratory findings in comparison.

	Initial Laboratory Findings	Discharging Laboratory Findings	P value (<.05)
Urea	41.17±34.88	39.25±29.46	.89
Creatinine	1.2±0.96	1.09±0.91	.78
Lactate Dehydrogenase	823.83±633.60	540.83±326.35	.18
Aspartate Transaminase	59.42±37.51	37.61±19.50	.09
Alanine Transaminase	61.92±45.52	57.83±36.68	.81
Haemoglobin	12.35±2.6	10.85±2.19	.14
Haematocrit	36.94±7.23	33.18±5.66	.17
White blood cell count	14177±5916	8560±3599	.001
C- reactive protein	6.06±10.51	10.01±18.55	.53

members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Yelda Deligöz Bildacı, Rümeyza Kazancıoğlu; **Design:** Yelda Deligöz Bildacı, Ömer Celal Elçioğlu, Meltem Gürsu; **Control/Supervision:** Yelda Deligöz Bildacı; **Data Col-**

lection and/or Processing: Yelda Deligöz Bildacı, Ömer Celal Elçioğlu, Meltem Gürsu, Rümeyza Kazancıoğlu; **Analysis and/or Interpretation:** Yelda Deligöz Bildacı, Ömer Celal Elçioğlu; **Literature Review:** Yelda Deligöz Bildacı, Ömer Celal Elçioğlu, Meltem Gürsu, Rümeyza Kazancıoğlu; **Writing the Article:** Yelda Deligöz Bildacı; **Critical Review:** Meltem Gürsu, Rümeyza Kazancıoğlu; **References and Findings:** Rümeyza Kazancıoğlu; **Materials:** Rümeyza Kazancıoğlu.

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