

**Congestive Cardiac Failure and
Electrocardiographic
Abnormalities in Acute
Glomerulonephritis**

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Congestive cardiac failure (CCF) is a common manifestation of acute glomerulonephritis (AGN), and occurs in 15% to 50% of children with AGN (1-4). This study was undertaken to evaluate cardiac involvement and ECG abnormalities in AGN.

Subjects and Methods

Fifty cases of AGN, aged between 3-13 years admitted to the Pediatric wards of J.J.M. Medical College formed the material of this study. The criteria for selection of cases were: acute onset of edema, oliguria

and hematuria with or without hypertension and proteinuria along with evidence of antecedent streptococcal infection (history of recent pyoderma, healed ulcers or raised ASO titer). A detailed history and clinical examination was done. CCF was considered to be present when the child had enlarging liver size, tachycardia, tachypnea and basal crepitation with or without raised jugular venous pressure, respiratory distress, gallop rhythm and orthopnea. Patients were checked daily for blood pressure, urine examination and weight, and intake-output charts were maintained. Specific gravity, macroscopic and microscopic appearance, urine protein and 24 hours urine protein were estimated, serum cholesterol, serum sodium and potassium, ASO titers and serum C3 levels were estimated in all cases

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ECG and chest-X-ray were done in all cases. After discharge, all the children were called for regular follow-up during which blood pressure measurements, and urine examinations were done.

Results

Edema was present in all children. Hypertension of varying severity was seen in 42 cases (84%) and CCF in 13 cases (26%). Twelve of the 13 children with CCF had hypertension, 10 of whom had severe hypertension and the remaining 2 had significant hypertension when classified by standard criteria(5). The remaining 1 child with CCF was normotensive, and the cause of the CCF was probably myocarditis, as indicated by muffled heart sounds and low voltage complexes on ECG.

Hyponatremia was seen in 2 children, hyperkalemia in 5 children and hypokalemia in 1 child with CCF. All other children had normal serum electrolytes. X-ray abnormalities included cardiomegaly (36%), pleural effusion (28%), pulmonary edema (24%), consolidation (16%) and pulmonary vasculature changes (40%). Of the 13 children with CCF, 7 had abnormal radiologic findings.

ECG changes were seen in 23/42 children with hypertension as compared to 3/ 8 children with normal blood pressure. Only 2/13 children with CCF had normal ECGs. The ECG changes consisted of tachycardia, bradycardia, prolonged Q-Tc intervals (more than 98th percentile for age), low voltage QRS complexes (less than 3rd percentile for age), ST segment changes, tall T Waves (more than 98th percentile for age), U waves, right axis deviation and left axis deviation (*Table 1*).

Discussion

In this study of 50 children with AGN, CCF was seen in 26%, which is consistent with the range of 15 to 50% reported in the literature(1-4). However, a study by Fliesher(7) questions whether heart failure ever occurs in AGN. Although a majority of the patients with CCF have hypertension, this is not the only cause of cardiovascular symptoms. Other causes include increased plasma volume, hyperkalemia, administration of large quantities of fluids especially when anuria or oliguria is present(8).

Gore and Saphir have described significant patchy areas of myocardial changes at postmortem examination in 10% of 160 cases who died after AGN(9). Three cases in the present study had evidence suggestive of myocarditis and 2 had CCF and 1 did not have CCF. Myocarditis in acute glomerulonephritis is well documented(10). In other studies(3,4) 83% and 50% of patients, respectively with CCF were normotensive, though the evidence of myocarditis in them had not been documented. In the present study, 11 of the 13 cases with CCF had evidence of ECG abnormalities.

ECG abnormalities were observed in 52% children in this study, which is within the range of 5-75% reported in various studies(3,4). The ECG changes described are similar to the ones seen in this study(3).

This study shows that CCF and ECG abnormalities are fairly common phenomenon in AGN. ECG changes, though nonspecific, are more common in hypertensive patients. An occasional child can have CCF in the absence of

TABLE I—Relationship of ECG Changes with Hypertension

ECG changes	No. of cases	Normotensive (n = 8)	Hypertensive (n = 42)
1. Heart rate			
Tachycardia (120/min)	11 (22)	3 (6)	8 (16)
Bradycardia (60/min)	3 (6)	Nil	3 (6)
2. Prolonged Q-Tc interval*	16 (32)	1 (2)	15 (30)
3. Prolonged P-R interval*	2 (4)	—	2 (4)
4. ST segment			
Elevated	4 (8)	—	4 (8)
Depressed	3 (6)	—	3 (6)
5. T-Wave			
Tall T-wave*	6 (12)	—	6 (12)
T-wave inverted (V5-V6)	5 (10)	—	5 (10)
6. U-wave	2 (4)	—	2 (4)
7. Right axis deviation	2 (4)	—	2 (4)
Left axis deviation	1 (2)	—	1 (2)
Low voltage complexes	3 (6)	1 (2)	2 (4)

Figures in parentheses indicate percentages; * [More than 98th percentile for the age (6)]

hypertension, and myocarditis may be the cause of CCF in such children. However, echocardiography with color doppler tracing would be more definite in establishing a diagnosis of myocarditis and cardiac dysfunction in such children.

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NOTES AND NEWS

**SOUTH ZONE WORKSHOP ON "EARLY DIAGNOSIS, PREVENTION AND
MANAGEMENT OF CHILDHOOD DISABILITY"**

The Indian Academy of Pediatrics, Childhood Disability Group is organizing this event on 8th September at Thrissur. For further details please contact: Dr. K. Jacob Roy, 'Villa Tropicana' XV/496, Thrissur Road, Kunnankulam 680 503, Kerala.

**SECOND STATE-OF-THE-ART WORKSHOP ON NEONATAL
RESUSCITATION**

A State-of-the-art workshop on Neonatal Resuscitation is being organized by the Department of Pediatrics, on 15th September, 1996 (9.00 A.M. to 5.00 P.M. in Conference Hall). The workshop is targeted for practicing pediatricians/obstetricians and postgraduate students. Registration would be limited to 50 participants on the first come first served basis. Please send the draft/cheque of Rs. 250 drawn in favor of CME in Neonatology, AIIMS, New Delhi 29, latest by 31st July, 1996. Participants will be provided with resource book six week before workshop. Please note there will be no provision for spot registration. For further details, please contact Dr. Ashok K. Deorari, Associate Professor, Department of Pediatrics, AIIMS, New Delhi 110 029.

**X SOUTH ZONE CONFERENCE OF IAP AND XXV ANNUAL CONFERENCE
OF
IAP, KERALA STATE**

This event is to be held at Kollam, Kerala State from October 25-27, 1996. For further details please contact Dr. Thomas William, Organizing Secretary, Benziger Hospital, Kollam 691 001. Tel: (O) 0474-742331-335, (R) 0474-77227 Fax: 0474-741762.