SUMMARY AND CONCLUSION

The present work was intended to evaluate the cardiac functions and hemodynamics in children with a cute poststreptococcal glomerulonephritis with variable degrees of severity. Moreover, to uncover the relative role played by the different unfavourable stress factors, including increased preload with or without an associated increase in afterload, in impairing ventricular systolic and diastolic function; if any. Also, to note whether the congestive manifestations commonly observed in APGN represent a pure state of circulatory congestion or congestive heart failure. Furthermore, to prove if there is an impairment in myocardial functions in those patients who present with clinical manifestation of heart failure.

It included fifty children with APGN admitted to Alexandria University Children's Hospital. The diagnosis of APGN was based on the presence of hematuria, edema together with clinical and serolgical evidence of recent streptococcal infection.

Patients were divided into three main groups according to the presence of hypertension with our without heart failure: group one: normotensives, group two: hypertensives without heart failure and group three: hypertensives with heart failure. The patients had their initial cardiac assessment within 72 hours of admission and a recovery assessment two weeks after the initial one.

In addittion to a thorough history taking, a full clinical examination and laboratory investigations (including urine analysis, ESR, C-RP, serum urea and creatinine), the cardiac assessment was carried out including : chest x ray P-A view, ECG and echocardiography including Mmode, 2D and Doppler examination).

In our study no significant difference was noticed between G2 and G3 as regards SBP, DBP, HR and CNV.Only in G3, RR was significantly increased together with the presence of gallop rhythm and basal rales. Only serum creatinine that was significantly increased in both G2 and G3 but not significantly different between G2 and G3. Both cardiothoracic ratios (initial and recovery)were not significantly different between the three groups. Pulmonary venons congestion was most severe in G3 and correlates positively with RR. The only ECG abnormality was flat or inverted T waves in lead I, which was not confined to one group, however, it was most common in G3 (33.3%).

Initial echo-Doppler study of patients in one group(PG-I) compared with the control subjects revealed a significant increase in LV walls (PW and IVS) and mass, LA dimensions and volumes, RA dimensions, RV volumes, mitral and tricuspid valve diameters as well as IVC minimal diameter in PG-I, whereas, there was an insignificant increase in LV and RV systolic functions as well as the mitral and tricuspid inflow parameters, however, IVC collapsibility was significantly depressed in PG-I. Comparing initial and recovery echo-

Doppler measurements, in addition to the aforementioned increase in dimension and volumes, left and right ventricular systolic and diastolic functions were insignificantly different. Moreover, the LA dimensions and ejection indices did not return to the control levels by the time of recovery evaluation. Comparing G2 with G3 revealed that LA end systolic volume, aortic and tricuspid valve diameters were significantly increased in G3, however , the ejection phase indices were significantly depressed in G3 especially EF%, FS%, COP and AO PP-ET. In some patients, transient mitral and tricuspid valve regurgitations were noted in G1, G2 and G3, however they were more severe and prolonged in G3, although they were clinically inaudible.

The CTR was positively correlated to RV and PV diameters, whereas, T_1 abnormality on ECG was correlated to diastolic dysfunction (IVRT and LA-EF). The SV and COP were positively correlated to increased LV preload while some diastolic function parameters were negatively correlated to afterload (ABP). Furthermore, heart failure was negatively correlated to LV syatolic function indices whereas it was positively correlated to LA volumes, duration of MR and severity of TR. Regression analyses revealed that MR time of disappearance was highly dependent on both LA cross sectional area and EF%, whereas TR time of disappearance was highly dependent on both TR grade and LVD-V. Heart failure was highly dependent on AO-FT, TR and MR grades.

From our study we concluded that:

- Increased preload on the right side of the heart mediated by sodium and water retention seems to be the main determinant of right sided congestive manifestations without ventricular function impairment.
- Increased left ventricular preload is relatively well tolerated, in children with APGN, through the effect of compensatory mechanisms including LA and LV dilatation with concomitent increase in stroke volume and cardiac output together with pulmonary venous congestion.
- No direct evidence indicating the occurance of myocarditis, however, mild myocarditis can not be rolled out as a cause of systolic dysfunction and/ or MR.
- The encountered AV valvular regurgitations seem to be influenced by different pathogenitic factors. The major determinants of transient MR were LA dilatation from increased preload together with increased afterload that subsequently increase the mitral annular diameter in addition to the possible mild myocardial damage in this post-streptococcal event. Transient TR seems to be preload dependent, however, heart failure may augment its severity.
- Echo-Doppler has proved to be superior over chest x ray or ECG in evaluating cardiac functions and hemodynamics including valvular regurgitation that should be followed up after clinical recovery as the presistence of TR signifies presistence of hypervolemia while that of MR signifies presistence of a relative myocardial dysfunction.

RECOMMENDATIONS

- Early assessment of the cardiac performance by echocardiography is of great value in early detection of cases with impaired systolic function who should be managed promptly before the appearance of overt heart failure.

- Proper adjustment of sodium and water balance, and frusemide therapy, particularly in those patients with associated TR, could alleviate the stress of hypervolemia on both sides of the heart and help in saving, the cardiac compensatory mechanisms.

- Prompt control of hypertension helps in alleviating an additional stress on cardiac functions and hemodynamics.

- Avoiding misdiagnosis of other causes of MR through the knowledge that MR can occur in children with APGN.

- Prevention of streptococcal infection for 3-6 months could be helpful in those patients with impaired systolic function and MR as a second attack with nephritogenic streptococci, although rare, may increase the risk of cardiac mortality.

- Further study of a common pathogenetic mechanism responsible for the cardiac involvement in the two post streptococcal events; APGN and ARF, is needed.