MATERIAL & METHODS
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The present study was carried out in the department of Medicine, H.E.B. Medical College, Thans. The case material of the present study consisted of patients having congestive heart failure admitted in the medical ward and/or attending medical OPD at the medical college. The period of study extended from August 1983 to July 1984. A total of 64 patients were observed during this period. These patients were assigned to 3 groups-A, B & C. Group A, the control group, had patients who received conventional decongestive therapy in the form of digoxin and diuretics. Group B received captopril and diuretics for treatment of CHF, all the cases kept in this group were in sinus rhythm and digoxin was not used in them. Group C patients received all the 3 drugs, i.e., digoxin, captopril and diuretics. Majority of the patients assigned to this group (82%) had severe chronic CHF which was deteriorating despite optimal doses of digoxin and diuretics.

The control group consisted of 22 patients out of which 15 were of valvular heart disease, 3 of ischemic heart disease (IHD), and 2 each of congestive cardiomyopathy and cor-pulmonale. Group B had 20 patients of which 11 were of valvular heart disease, 6 of IHD and 3 of hypertensive heart failure. The other study group, group C consisted of 21 cases of valvular heart disease and a single case of congestive cardiomyopathy.

All cases were subjected to detailed interrogation.
and clinical examination. The history of previous decongestive treatment was enquired in detail. Etiological diagnosis of congestive heart failure was confirmed by relevant investigations.

Severity of congestive heart failure at the initial examination was assessed by noting effort tolerance and the patients were grouped on the basis of NYHA classification. All patients had their routine blood (Hb, TLC, DLC, ESR) and urine analysis (routine and microscopic), blood urea, serum creatinine, blood sugar (fasting & post prandial), serum cholesterol, and SGOT, SGPT if required, done. X-Ray Chest and ECG was taken in every case. These investigations were repeated to monitor the prognosis as and when required.

The dose of captopril employed was 31.25 mg/day on an average and ranged from 6.25 mg to 75 mg/day. The drug was started with low doses and built up according to response and the side effects observed. Patients were asked to report about any side effects (nausea, vomiting, diarrhoea, headache, palpitation, postural giddiness, skin rash) if they ever experienced them. The dose of captopril was adjusted if required to produce the optimal response and to avoid adverse reactions. The patients of the control group received only digoxin and diuretics. The dosage of these drugs were adjusted according to the need of the patients.

The response to treatment was noted by observing the following parameters initially daily and then at weeks (weekly) interval. The data obtained was recorded on specific proforma (appendix I) designed for the purpose of analysis and evaluation.
of the results.

NYHA Class: Patients were graded according to NYHA (New York Heart Association) classification.

Class I: Patients with cardiac disease but with no limitation of physical activity. Ordinary physical activity causes no undue dyspnoea, anginal pain, fatigue or palpitation.

Class II: Patients with slight limitation of physical activity. They are comfortable at rest and with mild exertion. They experience symptoms only with more strenuous grade of ordinary activity.

Class III: Patients with marked limitation of physical activity. They are comfortable at rest but experience symptoms even with milder forms of ordinary activity.

Class IV: Patients with inability to carry out any physical activity without discomfort. Symptoms of cardiac insufficiency may be present even at rest and are intensified by activity.

24 Hour Urinary output: Patients were asked to collect their urine of 24 hours from the first day measured initially daily and later on at weekly intervals.

Weight: Weight was recorded to the nearest 0.5 kgs by using adult type of weighing machine. Same machine was used for subsequent follow-up to minimise instrumental error.

Heart Rate: The heart rate was recorded by auscultation at the chest directly. Duration of 1 minute was used for the record.

Blood pressure: This was recorded by mercury sphygmomanometer in lying and sitting position and in both upper & lower limbs if needed.
JVP: Jugular venous pressure was measured with patient propped up in bed in bed with his trunk, neck and head being in straight line and making an angle of 45° with the bed. Light was allowed to come and fall down on the neck tangentially. A scale was kept from the point of highest pulsation in internal jugular vein on right side towards manubrium sterni. Another scale was kept vertically from the angle of Louis. Vertical height of later scale in centimetres below the horizontal scale was taken as JVP. Depending on situation JVP was measured in other position also like 60° & 90°.

Liver size: Liver was measured in centimetres below subcostal margin in the mid-clavicular line.

Oedema: Oedema was recognised behind the malleoli of tibia and fibula of ambulatory patients and on sacrum who were confined to bed. Pressure of the finger was maintained for 30 seconds and pitting was noted.

Basal crepts: The lungs were examined for crepts by way of auscultation and monitore to see the effect of therapy on them.

Heart size: All patients had at least 2 X-Rays of chest done during the period of hospitalisation, one shortly after admission and other just before hospital discharge or during follow-up. If the patient was serious the X Ray film was taken in supine position but otherwise most of the films were exposed with the patients in upright position after inspiration at 6 feet distance. Cardiomegaly was assessed from the film by the cardiothoracic ratio, defined as the ratio between the transverse
diameter of the heart and internal diameter of the chest. The transverse diameter of the heart was obtained as the sum of the widest portion of heart from the right to the left border of cardiac silhouette at the midline. Internal diameter of the chest was taken as maximal internal thoracic dimension taken at the level of the highest point on the left hemidiaphragm. CT ratio above 0.5 was considered abnormal.

Pulmonary venous congestion on chest X-ray was graded. 

**Grade 0:** No pulmonary venous congestion. 

**Grade I:** Pulmonary venous hypertension defined as greater diameter of upper compared to lower lobe pulmonary vessels (film was taken in upright position). If the film was taken in supine posture, then pulmonary vascular redistribution and either peribronchial cuffing or loss of right hilar angle were taken as grade I. 

**Grade II:** Interstitial pulmonary oedema defined as loss of pulmonary vascular marking in association with Kerley B lines. 

**Grade III:** Localised alveolar oedema defined as confluent alveolar infiltrates in perihilar area and lower lung field. 

**Grade IV:** Diffuse alveolar oedema defined as diffuse confluent alveolar infiltrates throughout most area of both lung fields.

Clinical follow-up: The dosage of captopril was kept constant at discharge and patients were asked to attend the medical OPD for their evaluation at weekly intervals regularly. All the possible complicating events like side effects and drug toxicity response to therapy (improvement/worsening of CHF) and death if it occurred were recorded.