Diabetes mellitus is associated with an increased risk of adverse clinical outcomes after percutaneous coronary intervention (PCI). The prognosis of patients with diabetes mellitus and chronic total occlusion (CTO) treated with PCI is poorly investigated. Current study evaluates outcome of successful PCI on CTO in patients with and without diabetes. One hundred and sixty three patients treated with successful PCI on CTO between January 2009 and March 2011 were prospectively identified from the PCI registry at the Madani Heart Center, Tabriz, Iran. Patients were followed for 15±3 months, were evaluated for the occurrence of major adverse cardiac events (MACE) comprising death, acute myocardial infarction, and need for repeat revascularization. No differences were found in baseline clinical and procedural variables between patients with (n=34) and without diabetes (n=129), unless for hypertension (p=0.03). Hospitalization period after PCI in diabetics (3.26±0.61 days) and non-diabetics (2.86±0.52 days) was similar. In-hospital MACE occurred in 8 (23.5%) individuals of diabetics and 10 (7.8%) individuals of non-diabetics (p=0.02), among them revascularization was significantly higher in diabetics (20.6% vs. 7%, p=0.04). Follow-up events in diabetic and non-diabetic groups were 12 (35.3%) and 37 (28.5%), respectively (p was not significant). In patients undergoing successful PCI on CTO, diabetes is associated with higher in-hospital adverse events; however diabetes does not affect long term outcomes in these patients.
2. Materials and Methods

Patients were identified using the PCI registry at the Madani Heart Center. Patients who underwent successful PCI of a CTO between January 2009 and March 2011 were included in this analysis. Information was prospectively recorded, including baseline demographics, clinical and procedural characteristics, and in-hospital outcomes. Patients were followed for one year and major adverse cardiac events in hospital and in one year follow-up were recorded. All procedures were followed in accordance with the Declaration of Helsinki. A CTO was defined as complete obstruction of the vessel with thrombolysis in myocardial infarction antegrade flow 0 with an estimated duration ≥1 month with or without visible collateral flow, whether antegrade or retrograde. Patients with acute MI within seven days before the procedure and those with CTO of a venous or arterial bypass conduit were excluded. Patients were included in all analyses only once, based on the earliest procedure recorded in the database, and those included in the CTO cohort were excluded if they underwent non-CTO PCI during the study period. Angiographic success was defined as successful balloon dilatation of the lesion, with or without stent placement, with less than 40% residual stenosis. Procedural success was defined as angiographic success with no in-hospital major adverse cardiac event (MACE), defined as death, MI with new Q-waves on electrocardiogram (ECG) or urgent target vessel revascularization (TVR) (including both repeat PCI and coronary artery bypass graft surgery [CABG]). New MI was defined as elevation of creatine kinase-MB to > 2 times the upper limit of normal with recurrent ischemic symptoms following PCI. Post-procedural ECGs were routinely assessed for new Q-waves; however, cardiac troponin, creatine kinase and creatine kinase-MB fraction were not routinely collected.

2.1. Statistical analysis

The overall cohort of patients with successful PCI was divided into diabetic and non-diabetic subgroups. Baseline characteristics were then compared between groups using the Student’s t-test for continuous variables and chi-squared or the Fisher exact test for discrete variables. Data are listed as mean±standard deviation for continuous variables and as percentages for discrete variables. A level of p <0.05 was considered significant. All calculations were done with SPSS (Version 16) for Windows.

3. Results

3.1. Thirty Baseline Characteristics

One hundred and sixty three patients undergoing successful PCI of CTO were studied. There were no significant differences between groups with respect to baseline characteristics, medical history and risk factors, or prior cardiovascular disease unless hypertension (Table 1). Table 2 shows the procedural characteristics according to diabetic and non-diabetic groups. Most of the procedural characteristics of the two groups were similar.

Table 1. Clinical characteristics of patients who underwent PCI.

<table>
<thead>
<tr>
<th></th>
<th>Diabetic (n=34)</th>
<th>Non-diabetic (n=129)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years, mean (SD)</td>
<td>58.11 (10.94)</td>
<td>58.23 (11.13)</td>
<td>NS</td>
</tr>
<tr>
<td>Male, No. (%)</td>
<td>22 (64.7%)</td>
<td>104 (80.6%)</td>
<td>NS</td>
</tr>
<tr>
<td>Smoking current, No. (%)</td>
<td>7 (20.6%)</td>
<td>47 (36.4%)</td>
<td>NS</td>
</tr>
<tr>
<td>Poor left ventricular ejection fraction, (&lt;30%) No. (%)</td>
<td>2 (8%)</td>
<td>5 (4.3%)</td>
<td>NS</td>
</tr>
<tr>
<td>Familial history of coronary disease</td>
<td>3 (8.8%)</td>
<td>21 (16.4%)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Table 2. Procedural Characteristics According to Diabetic and Non-Diabetic Groups.

<table>
<thead>
<tr>
<th></th>
<th>Diabetic (n=34)</th>
<th>Non-diabetic (n=129)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target vessel of intervention, No. (%)</td>
<td>NS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left anterior descending</td>
<td>19 (55.9%)</td>
<td>79 (61.2%)</td>
<td>NS</td>
</tr>
<tr>
<td>Circumflex</td>
<td>6 (17.6%)</td>
<td>20 (15.5%)</td>
<td>NS</td>
</tr>
<tr>
<td>Right coronary artery</td>
<td>9 (23.1%)</td>
<td>30 (23.3%)</td>
<td>NS</td>
</tr>
<tr>
<td>Number of diseased vessels, No. (%)</td>
<td>NS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>19 (55.9%)</td>
<td>83 (65.4%)</td>
<td>NS</td>
</tr>
<tr>
<td>2</td>
<td>13 (38.2%)</td>
<td>27 (21.3%)</td>
<td>NS</td>
</tr>
<tr>
<td>3</td>
<td>2 (5.9%)</td>
<td>17 (13.4%)</td>
<td>NS</td>
</tr>
</tbody>
</table>

3.2. In-hospital and 12-months follow-up complications

All patients were evaluated after a follow-up of 12 months. In-hospital and 12-months follow-up events are described in Table 3. CTO procedure in diabetics was associated with a significantly higher rate of in-hospital MACE (23.5% vs. 7.8%, p=0.02), especially revascularization (20.6% vs. 7%, p=0.04). However, twelve months follow-up events in two groups were similar. Hospitalization period after PCI in diabetics (3.26±0.61 days) and non-diabetics (2.86±0.52 days) was similar.
Cardiac Care Network of Ontario study at two years with and without diabetes were 12% and 9% in the higher in diabetics. Revascularization rates in people hospital events, revascularization was significantly higher in diabetics (6.3% vs. 15.6%).

Unlike our study, in another study, MACE in diabetics was lower than non-diabetic patients. In-hospital MACE was significantly lower in diabetics and non diabetic patients. In-hospital MACE, N (%) 8 (23.5%) 10 (7.8%) 0.02

Cardiac death

1 (2.9%) 0 NS

Myocardial infarction

1 (2.9%) 1 (0.8%) NS

Revascularization

7 (20.6%) 9 (7%) 0.04

Target lesion

4 (11.8%) 7 (5.4%) NS

Other vessel

3 (8.8%) 2 (1.6%) NS

bleeding

1 (2.9%) 1 (0.8%) NS

MACE in 12 months

12 (35.3%) 37 (28.7%) NS

Cardiac death

0 2 (1.6%) NS

Non-cardiac death

0 3 (2.3%) NS

Myocardial infarction

3 (8.8%) 9 (7%) NS

Revascularization

11 (32.4%) 30 (23.3%) NS

4. Discussion

In this study, we compared clinical and one year follow-up outcome in successful PCI on CTO in diabetics and non diabetic patients. In-hospital MACE was significantly higher in diabetics. Unlike our study, in another study, MACE in diabetics was lower than non-diabetics (6.3% vs. 15.6%). Werner and coworkers reported that in diabetic patients treated with bare metal stent (BMS), the target vessel failure rate was almost double that in non-diabetic patients (64.3% vs. 35.3%). In contrast, there was no influence of diabetes mellitus on target vessel failure rate in the drug-eluting stent (DES) group (6.3% vs. 9.4%). In the current study, among in-hospital events, revascularization was significantly higher in diabetics. Revascularization rates in people with and without diabetes were 12% and 9% in the Cardiac Care Network of Ontario study at two years; the higher results were seen in our study, 32.4% and 23.3%, respectively. Data from Hoye et al., which were mainly from the BMS data, showed that successful revascularization confers a better outcome irrespective of the presence of DM, whereas Lee et al showed that the presence of DM still affects the patient’s outcome irrespective of complete and successful revascularization of the CTO. An additional interesting finding in Lee et al study was that DM was not a significant predictor of ischemia-related MACE in contrast to the case of total MACE. It is well recognized from large-scale studies that mortality is higher following PCI procedures in those with diabetes when compared with those without diabetes mellitus. Also, increased in-hospital mortality after PCI among patients with DM, regardless of the urgency of PCI was previously demonstrated. In a recent study, survival was significantly lower in those patients with diabetes mellitus. Within the diabetic population, 5-year survival was 84.9% in those with a successful recanalization against 79.1% following unsuccessful recanalization, suggesting that most of the benefit in terms of survival following successful recanalization is in the non-diabetic group. Results of current study showed that in-hospital mortality rate, although not significant, was higher in diabetic patients; on contrary, mortality in one year follow-up was higher in non-diabetics, mentioning role of other factors in long time survival. However, DM remains a risk factor for poor outcomes. During 9.6±2.0 months of follow-up after stenting of long (>50 mm) CTOs, DM correlated with the need for repeat PCI. Recent reports describing results of drug-eluting stent use in CTO demonstrate further improvements in outcomes. In one study, the one-year survival free of MACE was 96.4% among 56 patients (eight with DM) with CTO treated with sirolimus-eluting stents vs. 82.8% (p<0.05) among 28 patients (two with DM) with CTO treated with bare metal stenting.

MACE rate in diabetic patients was 10.5% during follow-up in Pei et al study: 3 deaths, 1 myocardial infarction and 11 repeated target lesion revascularization with PCI. Likewise, Safley and coworkers in the analysis of DM patients with CTO according to angiographic success of PCI, found no significant differences in either in-hospital (success 1.6% vs. failure 2.4%) or 1-year mortality (success 22.2% vs. failure 26.8%). This study suggested that PCI of CTO is safe in patients with DM. However, there is not a measurable improvement in survival in this DM-CTO population. In the current study, twelve months follow-up events in diabetic and non diabetic groups were 35.3% and 28.5%, respectively. These results were higher than reported follow-up MACE in other studies. Also, De Felice et al., observed that there were 27% and 21% events in diabetic and non-diabetic groups in follow-up period, respectively. The reason for this higher MACE rate in the two mentioned study would be because of multiple risk factors existence in diabetic patients.

5. Conclusion

Diabetes in patients undergoing successful PCI on CTO is associated with higher in-hospital adverse events; however diabetes does not affect long term outcomes in these patients.

6. Acknowledgments

This research was financially supported by Vice Chancellor for Research, Tabriz University of Medical Sciences, Iran. The authors are indebted to Cardiovascular Research Center, Tabriz University of Medical Sciences, Tabriz, Iran for its support.

Ethical issues

The study was approved by the Ethical Committee of the University.

Conflict of interests

No conflict of interest to be declared.
References


The Effects of Enhanced External Counterpulsation on Cardiac Electrophysiologic Properties of Patients with Ischemic Heart Disease and Refractory Angina at Function Class II-III

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ARTICLE INFO

Article Type:
Research Article

Article History:
Received: 9 Dec 2010
Revised: 17 Jan 2011
Accepted: 25 Jan 2011
ePublished: 28 May 2011

Keywords:
External Counterpulsation
Heart rate variability
Electrocardiography

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ABSTRACT

Enhanced external counterpulsation (EECP) is a noninvasive circulatory assist device that has been recently emerged as a treatment option for refractory angina or left ventricular (LV) dysfunction. The aims of this study were to examine the effects of EECP on the electrocardiographic parameters and the heart rate variability indices of patients with the coronary heart disease and function class II-III angina resistant to medication. In a descriptive study, the patients who presented with sever angina at function class II-III were studied. Those meeting the inclusion criteria were invited to participate and provided informed consent. The standard enhanced external counterpulsation treatment (35 one-hour procedures 5-6 times a week) was done. Thirty minute ambulatory electrocardiographic monitoring and electrocardiogram before starting and at the end of treatment sessions were done. Data entry and analysis of data was done finally. Twenty five patients with mean age 68±9 year including 21(84%) men and 4(16%) women were enrolled in this study. Electocardiographic parameters before and after treatment by EECP were not different statistically. Time domain indices of heart rate variability according to ambulatory monitoring findings were not changed significantly. Results of this study revealed that EECP didn’t improve the electrocardiographic and heart rate variability parameters of ischemic heart disease patients with refractory angina at function class II or III.

1. Introduction

Enhanced external counterpulsation (EECP) is one of the therapeutic options for improving the patient’s chest pain and quality of life. Studies showed that EECP can increase patient’s level of physical activity and decrease ischemia during exercise. EECP usually is the last therapeutic choice for ischemic cardiomyopathy and heart failure patients in which other therapeutic options failed to response properly. Ischemic heart disease and heart failure have multiple consequences on the conductive tissues of the heart. The effects of EECP on the conductive systems of the heart and the heart rate variability as markers of mortality and morbidity were not evaluated thoroughly. The aim of this study was to evaluate the effects of EECP on the conductive systems and the heart rate variability of ischemic heart disease patients.
2. Materials and Methods

With a descriptive prospective study, all ischemic heart disease patients who were candidates for EECP during year 2010 included in the study. The following patients were not admitted in the study were [patients with cardiac pacemakers, rhythm of atrial fibrillation or flutter and patients who didn’t want to attend in the study. Twenty five patients with ischemic heart disease and class II or III of chest pain (12 patients had history of coronary artery bypass surgery) who could finish their 35 session EECP were eligible to take part in the study. Informed consent was obtained from all patients. Medical history, physical examination, review of angiogram and medication as well as echocardiographic data of patients were evaluated thoroughly. A twelve-lead electrocardiogram (ECG) and 30 - minute ambulatory ECG monitoring were obtained before starting of EECP sessions and after the end of all sessions. Patients were followed for any possible complications of EECP. Data on QRS duration, PR interval, QT and QTc interval and indices of heart rate variability were collected. For collecting heart rate variability indices, a 30 minute holter monitoring without noise and without PACs or PVCs was selected for analysis. Data entry and analysis were done by SPSS 13 software for windows. Continuous variables showed as mean±SD and T-test was done to show differences. P value ≤ 0.05 considered as a significant difference.

3. Results

Twenty five patients (21 male) were studied. Mean age of patients was 68 ± 9 years (52 to 83 years). Mean left ventricular ejection fraction of patients was 32% ± 6% and all patients had history of myocardial infarction. All patients had documented coronary artery disease confirmed by coronary angiography, 6 patients had one vessel disease (1VD), 5 had 2VD and others had 3VD. All patients received optimal medical treatment including ACE-I, betablockers, lipid lowering agents, digoxin, diuretics, nitrates and aspirin.

3.3. Electrocardiographic findings

Mean of QRS duration was 108 ± 18 msec (millisecond) before EECP which decreased to 105 ± 17 msec at the end of study, this difference was not statistically significant. PR interval (Figure.1) changed from 134 ± 18 msec before EECP to 139 ± 17 msec at the end of study; this difference was not statistically significant. QT and QTc interval changed from 396±22 and 402±22 msec before EECP to 391 ± 24 and 399 ± 22 respectively after EECP, differences were not statistically significant (Figure. 2-3).

Figure 1. PR interval (millisecond) before and after EECP.

Figure 2. QT interval (milliseconds) before and after EECP.

Figure 3. Corrected QT interval (millisecond) before and after EECP.

Ethical issues

The study was approved by the Ethical Committee of the University.

Conflict of interests

No conflict of interest to be declared.
References


Renal failure predisposes patients to adverse outcome after coronary artery bypass surgery. Moderate to end stage renal dysfunction is known to be an important predictor of morbidity and mortality after coronary artery bypass grafting (CABG) and in this group a 5-year survival of less than 50% has been observed. A number of studies have identified indicators of preoperative impaired renal function as risk factors for mortality and morbidity with CABG. Patients with chronic renal failure (CRF) have other risk factors for cardiovascular mortality like hypertension, left ventricular hypertrophy, myocardial dysfunction, abnormal lipid metabolism, anemia and increased plasma homocysteine levels. CABG indications in these patients are the same as patients without renal failure having coronary artery disease. CABG in comparison to standard medical treatments has better survival rate. It should be noted that patients with chronic renal failure clearly differ in several aspects from other patients who undergo surgical coronary revascularization. Patients with end stage renal disease (ESRD) often have multiple risk factors, including hyperparathyroidism, hyperhomocysteinemia, and hypertension, which are associated with increased cardiovascular risk. In addition, patients with ESRD are at increased risk of periprocedural complications such as bleeding, infection, and dialysis-associated complications. These factors may contribute to increased morbidity and mortality following CABG in these patients.
comorbid disorders, including hypertension and diabetes mellitus, each with its own complications and associated impact on both short- and long-term survival. In addition, infection and sepsis have been identified as significant causes of morbidity and mortality in patients with ESRD undergoing cardiac surgical procedures. As a result of these factors and others such as perioperative volume and electrolyte disturbances, patients with chronic renal failure are at increased risk for complications after CABG. Early after revascularization, patients may expect relief from coronary symptoms with coincident improvement in overall functional status. However, long-term survival remains relatively limited in this patient population, suggesting a need for further investigations to establish the relative costs and benefits of revascularization in patients with dialysis-dependent ESRD.

2. Materials and Methods

We retrospectively analyzed the charts of 76 patients (16 women and 60 men with a mean age of 58.57±7.93 years) with different categories of chronic renal failure who undergone CABG from April 2000 to December 2010 in Shahid Madani Hospital, Tabriz. Forty (52.6%) patients were on dialysis. The cardiac disease leading to the operation was coronary artery disease (CAD) in all patients. Those with laboratory test taken at least 2 weeks before surgery were included. Patients with history of non-cardiac surgery were excluded. The study protocol was approved by the institutional ethics review board. All data were gathered from hospital records. Patients were managed by Helsinki agreement. The preoperative patient data are summarized in Table 1.

Table 1 - Preoperative status and demographic findings of patients.

<table>
<thead>
<tr>
<th>operation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective</td>
<td>22 (28.9%)</td>
</tr>
<tr>
<td>Emergent</td>
<td>54 (71.1%)</td>
</tr>
<tr>
<td><strong>Cardiac risk factors</strong></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>72 (94.7%)</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>28 (36.8%)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>45 (59.2%)</td>
</tr>
<tr>
<td>Obesity</td>
<td>34 (44.7%)</td>
</tr>
<tr>
<td>History of smoking</td>
<td>16 (21.1%)</td>
</tr>
<tr>
<td>Familial history</td>
<td>22 (28.9%)</td>
</tr>
<tr>
<td>Previous MI</td>
<td>22 (28.9%)</td>
</tr>
<tr>
<td><strong>Comorbidity</strong></td>
<td></td>
</tr>
<tr>
<td>Peripheral arterial vascular disease</td>
<td>0</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>8 (10.5%)</td>
</tr>
<tr>
<td>Neurologic disease</td>
<td>14 (18.4%)</td>
</tr>
<tr>
<td>Infection (including endocarditis)</td>
<td>0</td>
</tr>
</tbody>
</table>

**2.1. Statistical analysis:**

Continuous data with normal distribution are given as mean±standard deviation, otherwise as median, student t test for testing the significance of mean for independent continuous scale data, Chi-square or Fisher exact test for testing the significance of percentages. A $p$ value of 0.05 or less was considered significant.

3. Results

Twenty-eight patients (36.8%) had history of previous cardiac surgery. Forty (52.6%) patients were on dialysis. Table 2 demonstrates major adverse cardiac events (MACE) among CRF patients. The most common complication was bleeding (21.1%). Ventilation more than 48 hours was needed in 8 (10.5%) patients. Mean hospital stay was 10.16±7.16 days. Mean creatinine levels before surgery was 4.34±2.61 and 5.21±2.80 after surgery. Significant differences existed between creatinine levels before and after CABG ($p=0.001$). Also, there was significant differences between blood urea nitrogen (BUN) levels before (53.58±30.48) and after CABG (66.80±25.29) ($p=0.001$). MACE incidence in CRF patients with and without dialysis was 12 (30%) and 10 (27.8%) respectively; the difference was not significant.

Table 2 - Major adverse cardiac events (MACE) among CRF patients.

<table>
<thead>
<tr>
<th>MACE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In-hospital death</td>
<td>8 (10.5%)</td>
</tr>
<tr>
<td>MI in hospital</td>
<td>8 (10.5%)</td>
</tr>
<tr>
<td>Need for In-hospital resurgery</td>
<td>0</td>
</tr>
<tr>
<td>In-hospital stroke</td>
<td>2 (2.6%)</td>
</tr>
<tr>
<td>In-hospital bleeding</td>
<td>16 (21.1%)</td>
</tr>
<tr>
<td>Bleeding type</td>
<td></td>
</tr>
<tr>
<td>Major</td>
<td>9 (56.2%)</td>
</tr>
<tr>
<td>Minor</td>
<td>7 (43.8%)</td>
</tr>
<tr>
<td>In-hospital infection</td>
<td>4 (5.3%)</td>
</tr>
</tbody>
</table>

* All patients had pneumonia

4. Discussion

Renal failure predisposes patients to adverse outcome after coronary artery bypass surgery. Renal dysfunction is a predictor of increased morbidity and mortality after CABG, whether it is dialysis-dependent or not. CABG indications in these patients are the same as patients without renal failure having coronary artery disease. CABG in comparison to standard medical treatments has better survival rate. Whether CABG can be performed safely in renal failure patients, and how, have remained questions of great concern in recent years. Fluid overload and pulmonary congestion related to cardiopulmonary bypass, anemia, and the bleeding tendency in these patients are sources of worry for most surgeons. The proportion of patients with non-dialysis-dependent mild renal insufficiency who require coronary
revascularization is much higher than that with dialysis-dependent renal failure, but it is less well known whether mild renal insufficiency influences the clinical outcome after heart surgery.13,15 Rao et al. have shown that patients with non-dialysis-dependent mild renal insufficiency are elderly and diabetic, with a higher prevalence of hypertension, peripheral vascular disease, and left ventricular dysfunction in comparison with the routine population undergoing CABG14. Patients in their study group also had a significant difference in body mass index. A majority of patients undergoing CABG are male. At the same age, weight, and level of serum creatinine women have a lower eGFR while there may be a different qualitative relationship between renal function and risk of future cardiovascular disease in women.16 In this study seventy six patients with CRF (52.6% on dialysis before surgery) were studied. Patients' mean age was 58.57±7.93 years and most (78.9%) were male. In Samuels et al. study most patients were male (81.8%), with a mean age of 71 years13. Although gender distribution is likely the same, patients were older in Samuels et al. study. The increase in morbidity and mortality associated with dialysis-dependent renal disease is widely recognized.14,15-18 An increased morbidity has also been shown in association with moderately elevated serum creatinine levels in patients with non-dialysis-dependent renal insufficiency.14 In this study MACE occurred in 28.9% of patients. Its incidence among dialysis and non dialysis patients was 30% and 27.8%, respectively. However, MACE incidence between patients with renal failure dialysis or not-dialysis dependant was not significant. Reported postoperative complications incidence is 48% in dialysis-dependent renal failure,17 which is much higher than our results. Previous studies have shown that the morbidity and mortality of patients with dialysis-dependent renal insufficiency ranges from 25% to 81% and from 5% to 19%, respectively.13,15 The reported mortality rates in patients with non-dialysis-dependent renal dysfunction were between 5.3% and 19.3%.6,15,19 Thus, these strongly suggest that patients with mild renal insufficiency, despite the absence of dialysis, remain at risk for adverse outcomes. Samuels et al. suggested that patients over the age of 70 years with chronic renal failure are at a substantial risk of hospital death and major morbidity event after CABG13. A recent report described a serum creatinine level greater than 1.6 mg/dl as the most important predictor of in-hospital mortality after coronary reoperation in patients aged 70 and over20. Therefore, the therapeutic strategy should be chosen carefully in elderly patients with elevated serum creatinine. Preoperative mortality incidence among our patients was 10.5%. In-hospital mortality was 15% in dialysis dependant patients and 5.6% in non dialysis CRF patients which was not significant. The same results were observed in Nakayama and coworkers’s study. In their study, hospital mortality was 11% in non dialysis and 5.9% in dialysis dependant patients with no significant difference; however unlike our findings mortality rate was higher in patients with no dialysis13. Similar to our findings, in-hospital mortality between dialysis-dependent renal failure patients in Liu et al22 study was 12.2% and 13.8% in Horst and coworkers23. Samuels et al reported hospital mortality rate of (23%) with 4 (31%) hospital deaths in patients on dialysis and 6 (19%) in patients with no dialysis13; as is seen, the highest mortality rate even in dialysis nor in non dialysis CRF patients was reported by Samuels et al, which is considerably high in dialysis patients. Other complications observed in our study were myocardial infarction (MI) in 10.5%, in-hospital stroke in 2.6%, in-hospital bleeding in 21.1% consisting of 11.8% major but not in need of re-exploration and 9.3% minor bleeding and in-hospital infection in 5.3%, all having hospital acquired pneumonia. In non-dialysis-dependant renal failure patients, reported postoperative recovery was longer, which is associated with a more frequent occurrence of major complications (28.8%) and mortalities (6.8%). Postoperative stroke and mediastinitis were both 3.4%, also postoperative hemodialysis was 13.6% and long term mechanical ventilation was 10.2%. Postoperative MI was not seen in any cases.24 Prevalence of acute renal failure requiring dialysis has been reported to range from 0.5 to 1.1% of patients undergoing cardiac surgery25. In this study, mean creatinine and BUN levels were significantly increased after surgery, considering the need for dialysis in patients with CRF not on dialysis. Postoperative hemodialysis rate was 33.3%. Hayashida et al reported 11% need for postoperative dialysis26. In Samuels et al. study, in non-dialysis patients there were 8 (26%) patients who required permanent postoperative dialysis13. The high prevalence of postoperative dialysis in our patients could be due to high preoperative creatinine levels (over 3 mg/dl) in CRF patients but not on dialysis. It is suggested that for CRF patients not on dialysis with a creatinine 2.5 gm/dL, there is a strong likelihood of permanent postoperative dialysis.13

5. Conclusion

In conclusion, results of present study showed that chronic renal failure whether dialysis-dependant or not increases in-hospital mortality and morbidity in patients undergoing CABG. For CRF patients not on dialysis with a creatinine 2.5 gm/dL, there is a strong likelihood of postoperative dialysis.

6. Acknowledgments

This research was financially supported by Vice Chancellor for Research, Tabriz University of Medical Sciences, Iran. The authors are indebted to Students’ Research Committee (SRC), Tabriz University of Medical Sciences, Iran for its support.
Ethical issues

The study was approved by the Ethical Committee of the University.

Conflict of interests

No conflict of interest to be declared.

References

The Relationship between Serum NT– Pro-BNP Levels and Prognosis in Patients with Systolic Heart Failure

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ARTICLE INFO

Article Type: Research Article

Article History:
Received: 7 Feb 2011
Revised: 22 Feb 2011
Accepted: 16 March 2011
ePublished: 28 May 2011

Keywords:
Heart failure
Pro-BNP
Prognosis
Mortality
Morbidity

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ABSTRACT

Most studies reported using N-terminal pro-brain natriuretic peptide (NT-proBNP) in diagnosis of heart failure but there is controversy about use of these tests in determining prognosis and classification of severity of heart failure. The objective of this study was to determine the value of plasma NT-proBNP levels assessment in evaluation of mortality and morbidity of patients with systolic left ventricular dysfunction. A cohort study was performed in 150 patients with heart failure since September 2009 until February 2010. The patients were followed for 6 months to assess their prognosis. Patients were divided into two good and bad prognosis groups according to severity of heart failure in New York Heart Association (NYHA) class and frequency of hospital admission and mortality due to cardiac causes. Patients with good prognosis had ≥1 admission or no mortality or NYHA class≥2 and patients that had one of this criteria considered as bad prognosis groups. Pro-BNP levels were measured at baseline and left ventricular ejection fraction (LVEF) was estimated with echocardiography. Data was analyzed with using Chi-square, t-test, ANOVA, Kruskal-Wallis tests. In patients with heart failure that enrolled in this clinical study, ten patients were lost during follow-up. The mean of NT-proBNP is significantly correlated with ejection fraction (p=0.003) and NYHA class (p<0.001). In our study among 140 patients who were follow-up for 6 months, 11(9.7%) of individuals died with mean NT-proBNP of 8994.8±8375 pg/ml, in survived patients mean NT-proBNP was 3756.8±5645.6 pg/ml that was statistically significant (P=0.02). Mean NT-proBNP in the group with good prognosis was 2723.8±4845.2 pg/ml and in the group with bad prognosis was 5420.3±6681 pg/ml, difference was statistically significant (P=0.0001). Our study in consistent with other studies confirns that NT-proBNP is significantly correlated with mortality and morbidity. This could be predicting adverse out come and stratification in patients with heart failure. It is recommended that more research be performed in Iran.

1. Introduction

Heart failure (HF) is a major public health problem in industrialized nations and the United States is responsible for approximately one million cases and 50,000 hospital deaths annually.¹ Heart failure has cost in the USA over 8 million dollars a year and 5% of all admissions in the UK (United Kingdom) are diagnosed with heart failure.² The prevalence of heart failure is increasing in many parts of the world and prognosis is poor, especially if the symptoms are due to left ventricular systolic dysfunction (LVSD). If patients are treated with Renin - Angiotensin blockers system, Aldosterone blockers, and B- blockers properly, prognosis could be better. Thus the main importance is to
identify LVSD fast in patients to start appropriate treatment with the confidence. Repeatedly shown that the diagnosis of heart failure in suspected patients are not reliable; patients with suspected heart failure should be sent for echocardiography commonly, but in many countries echocardiography is hardly possible due to limited services in primary care. Records obtained more than 10 years ago shows that natriuretic peptides are markers of left ventricular wall stress, especially brain natriuretic peptide (BNP) or N-terminal product derived (NT-Pro-BNP) peptide progenitor, that possible resolve this problem. Many studies have investigated the effect of natriuretic as a diagnostic factor of left ventricular dysfunction in patients. BNP is secreted by myocardial cells in response to increased volume and pressure. This precursor molecule is divided into active BNP and inactive N-Terminal fragment Pro-BNP (NT-Pro-BNP). Comparison of BNP and NT-Pro-BNP has shown that both molecules effective in diagnosing left ventricular dysfunction in acute care and rapid decision. All studies have shown NT-Pro-BNP levels as predictors of future cardiovascular changes and mortality following acute coronary syndromes. In an article published in 2005 it has reported that the in patients have been sent for echocardiography with suspected heart failure in primary care, NT-Pro-BNP levels are effective in refuse of left ventricular failure. Most studies are using Pro-BNP in diagnosis of heart failure but use of these tests in determining prognosis and classification of severity of heart failure is controversy. So, in this study we tried to determine the severity of heart failure according to Pro-BNP measurement that offer lower cost and faster method for assess the patients in emergency and classification of heart failure and thus reduce follow up costs and unnecessary admissions.

2. Materials and Methods

In this cohort study 150 patients with heart failure, that were admitted to Zanjan, Vali-asr and Beheshti hospitals and emergency rooms since Sep. 2009 until Feb. 2010 have been included. In patients with heart failure, severity were divided into four classes (I, II, III, IV) based on New York Heart Association functional classification (NYHA). Class I (mild), no limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, or dyspnea (shortness of breath). Class II (mild), slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, palpitation, or dyspnea. Class III (moderate), marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes fatigue, palpitation, or dyspnea. Class IV (severe), unable to carry out any physical activity without discomfort. If any physical activity is undertaken, discomfort is increased. All data were collected in questioners by a general physician. Patients with hyperthyroidism, acute pulmonary embolism, COPD, sepsis excluded from study. Ejection fraction (EF) determined with echocardiography by HDI 3500 was recorded in the initial questionnaire. Then 2 ml of blood was drawn after fasting for at least 8 hours and 20 minutes rest on arrival at the laboratory and after separation serums were kept at -70 °C. At the storage conditions, Pro-BNP serum levels will be sustained for at least 12 months. Pro-BNP were measured using ECLIA (electrochemiluminescence immunoassay), Roche company Germany and apparatus (Roche Co., Germany) Elecsys 2010. Mean while inter assay precision and total precision is reported for this method less than 7.2 and 2.3 percent respectively. Analytical sensitivity and functional sensitivity for ECLIA are 5 pg/ml and 50 pg/ml respectively. Patients were follow-up from the time of Pro-BNP serum measurement until 6 months for prognosis status (changing of the severity of heart failure and frequency of hospital admission and mortality due to cardiac causes) and this information was recorded in the period questionnaires that were completed in two months intervals. Patients were divided to two good and bad prognosis groups. Patients with good prognosis had no mortality or NYHA class ≥2 and patients that had one of this criteria considered as bad prognosis groups. Data were analyzed using frequency distribution tables, indices and central distribution and Chi-square, ANOVA, Kruskal Wallis, t-test and Risk Calculation by SPSS 14.

2. Results

In this study we studied 150 patients, 90 males (60%) and 60 females (40%). Patients had minimum age of 23 years old and maximum age of 102 years old, mean age was 58. 7±13.0 years old. In this study, 87 patients had only coronary artery disease. The mean Pro-BNP in patients was 4472.0±6554. 6 pg/ml and the highest level was 35000 and lowest level was 43. 96 pg/ml. With increasing in heart failure functional class, mean Pro-BNP levels also increase which is statistically significant, (ANOVA) P =0. 02 (kruskal wallis ) P =0. 0001 (Table 1).
Table 1. Mean Pro-BNP levels according to heart failure classification.

<table>
<thead>
<tr>
<th>Heart failure class</th>
<th>N (%)</th>
<th>Mean ± SD (pg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>38(25.3)</td>
<td>2100.3±2967.5</td>
</tr>
<tr>
<td>II</td>
<td>52(34.7)</td>
<td>4099.4±424.33.3</td>
</tr>
<tr>
<td>III</td>
<td>34(22.7)</td>
<td>6263.9±8071.6</td>
</tr>
<tr>
<td>IV</td>
<td>26(17.3)</td>
<td>6340.5±10180.0</td>
</tr>
</tbody>
</table>

In this study, 10 patients were excluded from the study due to lack of access or change of place of residence. Among the 140 people, 38 patients had one admission during this period, 17 patients had two admissions and 11 patients had three times or more admission and 74 patients had not hospital admission at all time. Mean Pro-BNP increased with increasing the number of hospital admission (ANOVA) P = 0.25, (kruskal wallis) P=0.01, (Table 2).

Table 2. Relationship between Pro-BNP levels and hospital admission.

<table>
<thead>
<tr>
<th>Number of admission</th>
<th>N (%)</th>
<th>Mean ± SD (pg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>74(52.9)</td>
<td>3377.6±5635.2</td>
</tr>
<tr>
<td>1</td>
<td>38(27.1)</td>
<td>4683.0±5581.4</td>
</tr>
<tr>
<td>2</td>
<td>17(12.1)</td>
<td>6498±8123.8</td>
</tr>
<tr>
<td>≥3</td>
<td>11(9.7)</td>
<td>4109.6±6196.0</td>
</tr>
</tbody>
</table>

Table 3. Relationship between Pro-BNP levels and underlying disease.

<table>
<thead>
<tr>
<th>Diseases</th>
<th>N</th>
<th>Mean ± SD (pg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAD</td>
<td>87</td>
<td>4125.0±5997.5</td>
</tr>
<tr>
<td>HTN</td>
<td>18</td>
<td>3652.9±7109.6</td>
</tr>
<tr>
<td>CAD&amp;HTN</td>
<td>31</td>
<td>5907.0±6888.9</td>
</tr>
<tr>
<td>Others</td>
<td>14</td>
<td>4504.2±2736.8</td>
</tr>
</tbody>
</table>

CAD: Coronary Artery Disease
HTN: Hypertension
Others: Cardiomyophathy, Diabetes, Valvular heart disease

Patients were divided based on cardiac ejection fraction (EF). Mean Pro-BNP levels increased with increasing of heart failure class that was significant statistically, (ANOVA) P = 0.02, (kruskal wallis) P =0.003, (Table4).

Table 4. Relationship between Pro-BNP levels and EF.

<table>
<thead>
<tr>
<th>EF</th>
<th>N</th>
<th>Mean ± SD (pg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-10</td>
<td>12</td>
<td>8399.2±8747.5</td>
</tr>
<tr>
<td>29-20</td>
<td>84</td>
<td>4885.2±1799.4</td>
</tr>
<tr>
<td>≥30</td>
<td>54</td>
<td>2956.6±4198.6</td>
</tr>
</tbody>
</table>

In our study among 140 patients with heart failure who were followed for 6 months, 11(% 9.7) died and mean Pro-BNP was 8994.8 ±8375 pg / ml in these patients and in other patients who survived during 6 months, was 3756.8 ± 5645. 6 pg / ml which showed the difference was significant statistically, (Mann - Whitney U, P = 0.02). Mean Pro-BNP was 5054.8 pg / ml among those admitted while in people who was not, mean Pro-BNP was 3377.6 pg / ml that difference was statistically significant (P=0.002). The mean age of heart failure patients who died was 74.8 years and in living people 67.5 years, this difference was statistically significant, (P=0.08, t-test) and (P=0.06, Mann-Whitney U test). The mean age among those patients who admitted (66 patients) was 70.4 years and in non-admitted patients (74 cases) was 66.1 years that was statistically significant, (P=0.05, t-test). Patients were divided based on prognosis, to two groups with good (n=65) and bad (n=75) prognosis. Patients with good prognosis had higher ejection fraction. Mean age of patients with good prognosis were 65.6 ± 14.5 years and bad prognosis group were 70.3 ± 10.6 years and this difference was statistically significant, (t-test) P = 0.03, (Mann-Whitney U) P = 0.06. Mean Pro-BNP in the patient with good prognosis was 2723.8 ± 4845.2 pg/ml and in the patient with bad prognosis was 5420.3 ± 6681 pg / ml.
that this difference was statistically significant, (t-test) P = 0.007, (Mann - Whitney U) P = 0.0001.

3. Discussion

The main finding of this study was that during 6 month follow-up of patients with heart failure, whatever the class of heart failure increases, the average Pro-BNP levels also increased. The plasma level of Pro-BNP, which is secreted mainly from the ventricle, is a well-established powerful risk marker in HF. Several authors have reported that plasma Pro-BNP is a prognostic predictor of mortality and morbidity in patients with HF.

In this study, the mean level Pro-BNP was determined based on the underlying disease and patients with concurrent CAD and HTN showed the highest level of Pro-BNP. Also our study showed that the mean Pro-BNP was high among the elderly. In our study, the mean level of Pro-BNP increased statistically significant with the severity of heart failure based on NYHA classification, similar to most of studies, especially in China and Italy. In this study, the mean Pro-BNP levels showed an increase with increasing frequency in hospitalized patients with heart failure, according similar to studies in Denmark. In our study, mortality was lower in patients with low Pro-BNP levels in agreement with study in Denmark that showed low levels of Pro-BNP is associated with lower risk of death, independent of age, sex and left ventricular EF. The mortality rate in patients with high amounts of Pro-BNP were higher according to another study in Britain and Germany that high values of mean Pro-BNP is listed as an independent predictor for mortality, and other studies refers to it. Our study showed that in patients who severity of heart failure according to NYHA classification was increased, had high mean Pro-BNP and their prognosis was bad that consistent with Masson et al. study in Italy. In this research, patients with high Pro-BNP had a bad prognosis than patients with lower Pro-BNP agreement with Tiong et al. study in England. In our study, patients with low mean Pro-BNP similar with Patrick et al. study were not admitted during the six-month follow-up that could be helpful in identifying outpatient to determine the risk of hospitalization in heart clinic. Patients with concurrent CAD and HTN had higher amounts of Pro-BNP in our study which none of other studies have not mentioned. In our study, mortality was 11 (7.9%) among 140 patients with heart failure during 6 months follow-up and mean Pro-BNP in these patients showed significant difference with patients who were alive at the end of six months. Mortality rate was 9 patients (10.1%) in Alberto et al. research in Italy during one-year follow-up in 89 patients and mean Pro-BNP was 1864.0 pg/ml that was consistent with our study. In Amir et al. study mortality rate was 26% and mean Pro-BNP was 1958 pg/ml. High mean Pro-BNP is strongly associated with severity heart failure in Iranian population. Mean Pro-BNP in our study was 4472 pg/ml and in Alberto study mean Pro-BNP was 1370 pg/ml. In our study, the mean age of heart failure patients who died was 74.8 years and mean Pro-BNP was 8994 pg/ml. In Hunt et al. study in patients 75 years and more mean Pro-BNP was higher than 3855 pg/ml. Probably high mean Pro-BNP among our patients is due to severity of disease. In James et al. study in Denmark low amounts of Pro-BNP roll out the left ventricular systolic dysfunction. Daniela study in Italy was shown significant relationship between NT-Pro-BNP and ejection fraction. Finally NT-Pro-BNP and abnormal echocardiography provide independent information for predicting prognosis in patients with heart failure that consistent with Tiong KL et al. study.

4. Conclusion

The major limitation in this study was that we did not find similar study in Iran that comparison Pro-BNP levels in Iranian healthy with heart failure patients. However we concluded that the measurement of Pro-BNP levels in heart failure patients could be used as an economic marker for evaluation of mortality and morbidity.

Ethical issues

The study was approved by the Ethical Committee of the University.

Conflict of interests

No conflict of interest to be declared.

References


Assessment of the Role of Education in Changing Lifestyle in Patients with Coronary Heart Diseases

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The idea which the progression of coronary artery disease is regularly reversible was previously radical concept but today it has become the most common. A number of interventions have been reported to arrest or reverse the progression of coronary atherosclerosis, many of which have been detailed in the time those include comprehensive changes in lifestyle. A total of 100 patients aged less than 65 years were interrogated, 50 patients in case groups and 50 in control groups. All severely ill patients, and patients aged more than 65 years were excluded. We used educational packages for all of our patients, to teach all of them risk factors for coronary heart disease (CHD) and how to change their lifestyle to reduce those risk factors. Data were analyzed by SPSS software. Patients in intervention group significantly reduce the intake of saturated fat, sugar, and cholesterol (p<0.001), increased their exercises (p<0.001), and stopped smoking (p<0.05), when compared with the usual case group. This study demonstrated that education has a very important role in changing lifestyles of CHD patents and it helped to reduce risk factors of CHD.

1. Introduction

Coronary heart disease (CHD) is a major public health problem in most of the developed and developing countries. Over the past century, epidemiological research has linked multiple biological as well as behavioral factors, for cardiovascular disease (CVD). There are four types of risk factors based on responsiveness to intervention and usefulness of modification; category one is factors for which interventions have proved to lower CVD risk. Category two includes factors for which interventions are likely to lowers CVD risks. Category three involves factors associated with increased CVD risks that if modified, might lower CVD risk. Category four includes factors associated with increased CVD risk factors but cannot be modified. Cigarette smoking, LDL cholesterol, hypertension and LVH are contributors of first category. Diabetes, physical inactivity, HDL, TG, small dense LDL, obesity, post-menopausal state are contributors of second category. Lifestyle modification and non-pharmacological therapy can significantly influence most of these risk factors. Patient education is an essential component of patient care after getting coronary has been found to be cost effective in terms of its potential to
reduce diseases recidivism and the length of hospitalization.\textsuperscript{5} As patients learn by a variety of methods, it is most efficacious to match an individual’s learning style with an appropriate teaching technique.\textsuperscript{6} In this study, we want to assess the ability of educational method on modifying the lifestyle.

### 2. Materials and Methods

The study was carried out in Shahid Madani hospital in CCU ward, cardiology department in Tabriz University of Medical Sciences during 2003-2004. Objective of this study was to assess effectiveness of education on changing lifestyle in coronary heart disease patients. The patients were divided into two groups: 50 patients in intervention group and 50 patients in control group; and assessed by questionnaire prepared for assessment of lifestyle and risk factors of CHD patients as per guidelines laid down by the center for disease. Mean age of cases 50.20± 9/35 and controls 52.86± 8/24; age variable was matched for the cases and controls. The higher number of matched cases and controls were 45-59 years old. In our study we used educational package (using American Heart Association and American College of Cardiology and WHO guideline for preventing heart attack and death in patients with cardiovascular disease) including risk intervention and goals for all of modifiable risk factors for changing the behaviors of CHD patients. This randomized controlled trial was performed based on intervention education group. Control group was not taken education package. Each intervention cases were a 30 minute individual consultation. Exclusion criteria included all the severely ill patients, patients aged more than 65 years, and all patients from out of Tabriz. Statically analysis was performed by studies using the student t-test randomized controlled trials with one experimental group and one control group and considering alpha error only.

\[
N = \frac{(Z_a)^2\times S^2}{(d)^2}
\]

The data were collected through the questionnaire, and investigation were entered in the computer before and after education in both intervention and control groups, using SPSS software version for analyses.

### 3. Results

We summarized our findings in three tables:
According to Table 1, the results showed that the association of reducing mean weight of patients in case group before and after education compared with control group was statistically significant (p < 0.05). After six month intervention (modification of lifestyle of patients) the average of FBS (Fasting Blood Sugar) in case group compared with controls was decreased, and it was statistically significant (p < 0.05). There were not significant differences between before and after education in cholesterol, HDL, LDL levels but these differences in mean of TG in case group was found to be statistically significant. Table 2 tabulated that association of non-smoking cases before and after education was statistically significant. Association of physical activity in CHD patients before and after education was also found to be statistically significant. Table 3 shows that there was significant association between before and after education in patient in using vegetarian diet in their regimen, consuming unsaturated oil at cooking, eating more fish, minimizing salt intake, consuming of fruits and vegetables, avoid adding sugar to their food.
3. Discussion

In this study we adopted individualized teaching in order to assist patients to understand the causes of MI and identify risk factors of coronary heart disease present in their lifestyles and suggest possible modification or the removal factors identified. We provided information about risk factors of CHD in structured educational packages in easily understandable way, to encourage patients to adopt behavior that will result in improved health status. The factors associated with development and progressions of atherosclerosis are complex and multifactor.

Various lifestyle factors such as smoking, lack of exercise and inadequate diet are risk factors for CHD. In our study, education about these risk factors and ways of modifying lifestyle, was lead to changing lifestyle in our patients and more important finding was that education and modification of lifestyle of patients with intervention package were independently associated with behavioral risk factors for cardio vascular disease and reducing of blood pressure; smoking; lack of regular exercise, and obesity. Dr Shahanfar and their assistants came to this conclusion about cardiovascular diseases, too. Finding of this study showed that a brief advice to e.g. stop smoking have a significant influence on smoking cessation in patients with coronary heart disease. These finding is similar to the result of Steven S et al and another result was the number of non-smoker after educational program was significantly higher in the interventional group. This finding coincides with the result that intervention in the form of individually planned consecutive teaching sessions achieved a reduction in cigarette consumption with a previous study by Scalzi et al. Many randomized controlled studies on lifestyle interventions aimed at reduction of serum cholesterol in coronary patients were studied. A study carried out by Ornish et al about effect evaluation of dietary changes in combination with stress was a significant difference between experimental group and control group in reduction of total serum cholesterol and reduction of TG but also reduction of HDL cholesterol. Clinical trials (e.g. campell et al in Scotland ) and observational studies (e.g. Buillardgeon et al in Canada ) have shown that a nurse led health education program have an impact on cardiac risk factor reduction in patients with CHD.

The program of lifestyle modification in patients, in our study, includes reduction of risk factors, quit of smoking, reduction of weight, meat consumption and lipid, control of blood glucose and stress reduction.

4. Conclusion

The results of our study showed that after health education in patients and modification of their lifestyle most of CHD risk factors reduced and this reduction in risk factors decreased the probability of sudden death and hospitalization rate in CHD patients.

Ethical issues

The study was approved by the Ethical Committee of the University.

Conflict of interests

No conflict of interest to be declared.

References

3. Peter libby, Robert O.Bonow, Primary and Secondary Prevention of coronary heart disease , J.Micheal Gaziano In Braunwald’s Heart Disease,Eighth edition ; USA ; Saunders ; 2008 :1119-1148
1. Introduction

Thymolipomas are rare anterior mediastinal tumors composed of mature adipose tissue and benign thymic tissue arising from thymus gland. This tumor accounts for only a small percentage of mediastinal masses. The majority of these tumors are clinically quiescent; however, symptomatic patients may present with myasthenia gravis, upper respiratory tract infections, dyspnea, tachypnea, and chest pain. Thymolipomas are benign neoplasms for which complete surgical excision is curative.

2. Case presentation

The patient was a 35 year old woman with a six month history of difficulty breathing and chest pain. Because of increased dyspnea, she was admitted in hospital. She did not smoke and had no known occupational exposure. An anterior-posterior chest radiograph revealed a severe widened mediastinum with small lung volumes. Pulmonary function tests showed a decrease in forced vital capacity (47% predicted) and forced expiratory volume (42% predicted) with a total lung capacity of only 72%. These findings were
interpreted as being consistent with mixed obstructive and restrictive lung disease. During his diagnostic evaluation, a computed tomographic scan was performed. There was a huge mass in the anterior mediastinum overlying the heart with extension into the left and right hemithorax, predominantly consisting of fat with scattered linear soft tissue (Figure 1-2). In left side postero-lateral thoracotomy, a large, encapsulated, vaguely lobulated mass weighting 1460 g was found within the anterior mediastinum, and resected completely. In cut section it was primarily consisted of mature-appearing adipose tissue with no area of hemorrhage or necrosis (Figure 3-5). The mass occupied approximately 80% of left and 50% of right pleural cavity, resulted in marked compression of posterior and inferior of right and left lungs. Histological examination revealed that the tumor was predominantly composed of lobules of mature adipose tissue intermixed with septa of thymic tissue containing abundant Hassall’s corpuscles. In addition the mass contained numerous polygonal myoid cells that were distributed and localized predominantly in the interface of thymic tissue and adipose lobules. The patient discharged in a good condition on 6th day after surgery. She had no problem till 18 month follow up.

3. Discussion

Thymolipoma is a very rare mediastinal tumor composing mature adipose and thymic tissue arising from thymus gland. It is a rare and benign mesenchymal tumor of mediastinum that is often asymptomatic. This tumor accounts for only a small percentage of mediastinal. Clinically, most thymolipomas are identified incidentally during a diagnostic workup for other medical problems, although some nonspecific signs
like upper respiratory infection, chest pain, dyspnea, tachypnea, and chronic nonspecific chest symptoms have been identified at the time of presentation.\textsuperscript{5} Thymolipomas have been reported to be associated with certain autoimmune medical conditions, such as graves' disease and myasthenia gravis.\textsuperscript{1,7} On computed tomographic scan, the most common patterns seen in thymolipomas are linear whorls of soft tissue intermixed with fat or predominantly fat with scattered linear soft tissue attenuation. Radiographically, thymolipomas may be confused with more common lesions, such as mediastinal teratomas, thymic hyperplasia, lipomas, and cardiomegaly.\textsuperscript{6} This broad radiologic differential diagnosis stresses the need for histologic evaluation in the diagnosis of anterior mediastinal masses. Anterior mediastinal liposarcomas have been described and liposarcomas of thymic origin do exist.\textsuperscript{9} Mediastinal liposarcomas may grossly resemble benign thymolipomas and may be associated with thymic tissue.\textsuperscript{9} Grossly, most thymolipomas are lobulated and encapsulated, range in size from 4 to 36 cm, and consist of yellow adipose tissue with no areas of hemorrhage and necrosis.\textsuperscript{8} Histologically, thymolipomas have a varying proportion of mature adipose and thymic components. In this case, the thymolipoma consisted of predominantly mature adipose tissue with scattered elongated aggregates and small round nodules of atrophic thymic epithelium embedded within fat. No lipoblast was identified. In one section of the tumor, reminiscent of myoid cells, was identified within the mature fat. Such clusters of myoid cells have been reported previously in thymolipomas\textsuperscript{10} such as present case, some thymolipomas show predominantly mature adipose tissue with only occasional remnants of thymic tissue. However, other thymolipomas have been reported to have a greater proportion of thymic tissue.\textsuperscript{3-6,8} The histologic differential diagnosis for thymolipomas includes lipoma, well-differentiated liposarcoma, and thymic hyperplasia.\textsuperscript{6} The distinction between a lipoma and a predominantly fatty thymolipoma may be difficult. In the latter, extensive sectioning and immunohistochemical staining for cytokeratin may highlight thymic epithelial elements in a thymolipoma. Liposarcomas typically have scattered nuclear atypia, lipoblasts, and no thymic epithelium. Thymic hyperplasia classically has unremarkable thymic architecture without presence of abundant adipose tissue. Thymolipomas may adhere to the adjacent structures and displace organs within the chest cavity, but invasion into adjacent structures has not been documented in the literature. The encapsulated and lobular nature of thymolipomas and lack of invasion into adjacent structures usually allow for a relatively uncomplicated surgical excision of the tumor. Our case represents an atypical clinical presentation of a giant thymolipoma. Eighty percent of thymolipomas present within the first 4 decades of life. Thymolipomas are often asymptomatic and are identified incidentally after diagnostic evaluation for nonspecific respiratory symptoms.\textsuperscript{10-11} In our case, the patient had long-standing respiratory complaints, which appears to have been directly caused by thymolipoma. The compression of the right and left lung by the thymolipoma in our case resulted in increased pulmonary parenchyma resistance and reduced lung volume. The reduced lung volume resulted in chronic respiratory symptoms and a primarily restrictive lung pattern. The chronically increased pulmonary vascular resistance led to development of pulmonary hypertension, cor pulmonale, heart failure, and ultimately death.\textsuperscript{4,11} This case highlights an atypical presentation of a thymolipoma, a rare, benign thymic tumor which can achieve a massive size, occasionally resulting in respiratory symptoms and death. Thymolipomas are benign neoplasms for which complete surgical excision is curative as our case\textsuperscript{10-11}.

\section*{Ethical issues}

The study was approved by the Ethical Committee of the University.

\section*{Conflict of interests}

No conflict of interest to be declared.

\section*{References}


Aortocaval Tunnel to the Superior Vena Cava: A Case Report

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ARTICLE INFO

Article Type:
Case Report

Article History:
Received: 21 Feb 2011
Revised: 4 March 2011
Accepted: 9 March 2011
ePublished: 28 May 2011

Keywords:
Aortocaval
Superior Vena Cava
Tunnel

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ABSTRACT

A 20-year old female with a rare anomaly of aortocaval tunnel to superior vena cava is presented. Rare cases of congenital communications between aorta and right sided of the heart has been reported previously. The patient underwent surgical repair and had uneventful recovery.

1. Case History

A 20-years old female presented with dyspnea on exertion of the New York Heart Association (NYHA) functional class II for the past 2 years. On physical examination a transthoracic two-dimensional echocardiography (2-D) and color Doppler revealed an enlarged left atrium and left ventricle, global left ventricular ejection fraction (LVEF) was about 45-50 percent, less than moderate mitral regurgitation (MR) with continuous flow in left atrium apart from MR jet.

Contrast injection for ruling out of common pulmonary vein was performed which showed no right sided chambers visualization. On transesophageal echocardiography ostium of left coronary artery and right coronary artery were seen with an isolated large duct (with width of 3x5 cm) which extended from left coronary sinus to the left atrium. The patient was scheduled for cardiac catheterization. Oximetry during cardiac catheterization revealed an increased oxygen saturation of 88% at right atrial level. Injections in left
ventricle and aortic root clarified the proximal and distal ending of the fistula compatible with a large size fistula of ascending aorta to left atrium. Normal coronary arteries and intact inter ventricular septum were also noted. The patient was scheduled for surgery. During surgery a large size duct extending from left coronary sinus to posterior of aorta was identified with a large size pouch (2×5 cm²) at top of left atrium with another orifice (5 mm) to SVC. Closure of fistula was performed via left coronary sinus with a 4×5 mm² Gortex patch and mitral valve was also repaired.

2. Discussion

Communication between aorta and right side of the heart includes coronary artery fistula, ruptured sinus of valsalva, congenital tunnel to right ventricle or right atrium, aortocaval fistula, rupture of dissecting aneurysm of ascending aorta,1 and pseudoaneurysm of the right coronary artery followed by formation of fistula between the aneurysm and right atrium. Aneurysmal aorto right atrial communication has been reported previously.2-3 Patients with this communication were asymptomatic. CT angiography and three-dimensional echocardiography now are key part in preoperative diagnosis. A congenital coronary artery fistula is abnormal direct communication between any coronary arteries and any cardiac chambers, as well as SVC, pulmonary artery, coronary sinus, and pulmonary veins.4 Although coronary artery fistulas commonly involve right heart chambers, drainage to SVC is rare. Congenital fistula with large aneurismal saculation draining in to the SVC from both coronary arteries has been reported.5,6 Selective coronary angiography has been defined the diagnosis. Surgical or trans catheter closure are therapeutic options.7 Aortocaval fistula is uncommon and can drain in to SVC or inferior vena cava. The other causes of aorto caval fistula include dissecting aneurysm in Marfan syndrome1 and trauma.8

Ethical issues

The study was approved by the Ethical Committee of the University.

Conflict of interests

No conflict of interest to be declared.

References