Cause and Long-Term Outcome of Cardiac Tamponade

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Cardiac tamponade is a life-threatening condition, whose current specific cause and outcome are unknown. Our purpose was to analyze it. We performed a retrospective observational study with prospective follow-up data including 136 consecutive patients admitted with diagnosis of cardiac tamponade, from 2003 to 2013. We thoroughly recorded variables as clinical features, drainage/pericardiocentesis, fluid characteristics, and long-term events (new cardiac tamponade ± death). The median age was 65 ± 17 years (55% men). In the baseline characteristics, 70% were no smokers, 12% were on anticoagulation, and 13 had suffered a previous myocardial infarction. In the preceding month, 15 patients had undergone a cardiac catheterization, 5 cardiac surgery, and 5 pacemaker insertion. Fever was observed in 16% of patients and 21% displayed other inflammatory symptoms. In 81% of patients, pericardiocentesis was needed. The fluid was hemorrhagic or a transudate in the majority, with positive cytology in 15% and bacteria in 3.7%. Main causes were malignancy (32%), infection (24%), idiopathic (16%), iatrogenic (15%), postmyocardial infarction (7%), uremic (4%), and other causes (2%). After a maximum follow-up of 10.4 years, cardiac tamponade recurred in 10% of the cases (62% in the neoplastic group) and the 48% of patients died (89% in the neoplastic cohort). In conclusion, most cardiac tamponades are due to malignancy, having this specific cause a poorer outcome, probably as a manifestation of an advanced disease. The rest of causes, after an aggressive intensive management, have a good prognosis, especially the iatrogenic. **(Am J Cardiol 2016;117:664−669)**

Because cardiac tamponade (CT) is a life-threatening condition, the speed of diagnosis and correct management are vital in the survival rate of the patients. The cause must also be taken into account.[1,2] To the best of our knowledge, data from CT causes are very scarce, and there are no series describing the follow-up on this disease. Thus, we designed a study to establish the cause and the current long-term prognosis of the CT in our community.

Methods

We performed a retrospective observational study with prospective follow-up data on 136 consecutive patients diagnosed of CT from March 2003 to April 2013. All of them were admitted to the Cardiac Care Unit of a tertiary-level referral hospital, which includes Cardiac Catheterization and Interventional Cardiology, Electrophysiology Unit, Cardiac Surgery, Oncology and Internal Medicine among other specialities.

Our aim was to determine the contemporary profile of patients with CT and the percentage of cases due to different subjacent diseases. Diagnosis was performed when a severe pericardial effusion (PE) and clinical signs were found, following the attending physician criteria. To avoid confusions, large PEs but without signs of CT were excluded. The follow-up was performed reviewing the medical history, making phone calls, and establishing new office appointments. Different variables of each patient were recorded: age, gender, medical history (recent myocardial infarction (MI), angioplasty, known malignancy, and so forth), symptoms, need of emergent pericardiocentesis or surgical drainage, pericardial fluid (PF) characteristics, and adverse events defined as a new CT ± death during follow-up.

Features of PF samples were analyzed. Volume, macroscopic aspect, biochemical values, microbiology, and cytology were described, when possible. PF were divided into 2 groups: transudate and exudate. Although Light's criteria were validated for pleural effusions, we used them to help us into the classification of the samples. Transudate was defined as a low−protein content fluid, whereas exudate was deemed as a rich−protein content one (ratio of PF protein to serum protein $\geq$0.5). We also considered the liquid as an exudate if it had proteins >3 g/dl, leukocytes $>10^3$/mm^3, erythrocytes $>10^5$/mm3, pH <7.3, or glucose <60 mg/dl.

All the patients were classified into the following groups (specific causes):

- Infection. It included any patient with clinical manifestations (cough, fever, and so forth), history of recent infectious disease, or PF characteristics suggesting this pathology. Subgroups were defined: viral, including

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Table 1
Baseline characteristics

Variable (%, unless noted)	Global (n=136)	Malignancy (n=44)	Rest of etiologies (n=92)
Male	75 (55%)	24 (54%)	51 (55%)
Age (years, mean±SD) {range}	64.99 +/- 16.76 {54.0,78.0}	59.98 +/- 14.49 {48.0,72.0}	67.38 +/- 17.3 {59.25, 80,75}
Smokers			
Current	18 (13%)	12 (27%)	6 (7%)
Previous	23 (17%)	19 (43%)	10 (11%)
Never	95 (70%)	13 (30%)	76 (83%)
Cancer	39 (29%)	32 (73%)	70 (8%)
Previous trauma	3 (2 %)	0	3 (3%)
Anticoagulation	16 (12%)	1 (2%)	15 (16%)
Previous miocardial infarction	13 (10%)	0	13 (14%)
Previous percutaneous coronary intervention	15 (11%)	0	15 (16%)
Previous pacemaker or Implantable cardiac defibrilator	5 (4%)	0	5 (5%)
Previous cardiac surgery	5 (4%)	0	5 (5%)
Provenence			
Emergencies	67 (49%)	26 (59%)	41 (45%)
Cardiology	24 (17%)	2 (4%)	22 (24%)
Other services	37 (27)%	15 (34%)	22 (24%)
Other hospitals	8 (6%)	1 (2%)	7 (8%)

human immunodeficiency virus (HIV), bacterial, fungal, and other infections. The classical prevalence of tuberculous (TB) pericarditis gave it sufficient significance to constitute an independent subgroup, including any individual with Koch's bacillus isolation in the PF or those with active TB infection.
- Neoplastic. It was defined as those subjects with medical history of active malignancy, those in which the study of the specific cause revealed a tumor, or those in which PF cytology was positive. Also, CTs due to radiation therapy were included.
- Uremic and dialysis-related PE were established in patients with advanced renal failure in dialysis or predialysis in which other causes were excluded.
- Iatrogenic category included any CT after an invasive medical (e.g., anticoagulation) or surgical procedure as cardiac surgery, cardiac catheterization, electrophysiology study, pacemaker, or implantable automatic defibrillator insertion.
- MI: cardiac free wall rupture and postinfarction pericarditis.
- Other causes. The remaining CTs with a specific cause were included in this group.
- Idiopathic CT were those in which after investigation no specific cause was found.

The IBM SPSS statistics version 20 software package for Windows (IBM corp., Chicago, Illinois) and Microsoft Office 2010 software package were used. Baseline characteristics of the patients are expressed as mean (standard deviation), continuous variables as median (interquartile range), and categorical variables as an absolute figure (percentage). Between-group comparisons were performed using Pearson chi-square for qualitative variables and Student t test or Mann−Whitney *U* test for continuous variables, as indicated by the dispersion of data. Long-term survival curves of the different groups were obtained using the Kaplan−Meier method, and comparisons were obtained using the log-rank test. The Cox proportional hazard regression model was used to analyze and select the variables independently associated with the appearance of long-term events. An excessive number of variables in the multivariate analysis was avoided by reducing their number using a prespecified model that included those deemed to be associated with prognosis or based on the univariate analysis. Thus, age (quantitative), smoking habit (yes/no/former smoker), effusion type (by all causes or dicotomic−tumor or not-), anticoagulation, previous cardiac catheterization, and infectious symptoms were included as covariates in the final models and several clinical events as dependent variables. Hazard ratios (HR) and 95% confidence intervals (CI) were calculated by backward stepwise regression analysis (Wald). The last follow-up was conducted on October 2014. The null hypothesis was rejected—no statistically significant differences—using a 2-tailed p value <0.05 as cutoff.

Results

A total of 136 consecutive CTs were identified. The baseline demographic and clinical characteristics are provided in Table 1. Emergent pericardiocentesis was necessary in 81% of the patients and surgical drainage in 18% (in postsurgical patients and when PE did not disappear). Regarding the macroscopic aspect of the fluid, 43% of the samples were hemorrhagic, 12% serous, and 26% serohemorrhagic. The median removed volume was 811 ± 552 ml (986.45 ± 673 ml in the neoplastic group and 712.39 ± 446 ml in the rest). After study, 34% were considered a transudative effusion. The cytology was positive in 15% and negative in 51%. If we only take into account the neoplastic, it was positive in 46%, negative in 25%, and undetermined in the rest. Bacteria were isolated in 5 patients (4%). Mantoux test was positive in 2 patients, neither of them with tuberculosis, whereas Zielh−Neelsen stain was negative in all the samples. PF adenosine deaminase levels were high in all the patients with diagnosis of tuberculosis. Serology of the