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Research Article

Study on the Evaluation of the Cardiologic Management of Pulmonary Embolism at the University Hospital of Cotonou

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Abstract

Objective: To evaluate the compliance of our diagnosis and therapeutic procedures with international recommendations.

Patients and methods: This is a retrospective study over a period of 5 years that included all patients admitted with suspected PE and those with Pulmonary Embolism (PE) confirmed prior to admission. Diagnostic and therapeutic procedures were based on those recommendations. We studied the compliance with the latest recommendations of management of the PE and search the factors of non-compliance at each stage.

Results: 206 adult patients were selected. The Wells score compliance was 84.15% with a right evaluation method in 90%. The compliance for DD use was 69.11% with lack of dosage in 13% and wrong use in 26%. The realization of Pulmonary Computer Tomography (ASCP) was marked by a compliance rate of 73.13% with a missing utilization in 11.7% and 33.3% of wrong realization in patients who did not need ASCP. Among the 206 patients included, the PE was confirmed in 120 patients (58%), and reversed in 40 patients (20%) and unqualified in 46 patients (22%). In patients with PE overturned all showed clinical low and middle probability and the denial of the PE processes were non-compliant in 60 % of cases. Risk level stratification was made in 26.67% of patients with confirmed PE and its assessment was consistent with the recommendations in 87.5% of cases. Thrombolytic therapy was performed in 2 out of 4 patients with a high risk taking into account the existence of absolute contraindications and financial limitation. VKA were introduced in 92.50% of cases. In 55.85% of cases, their introduction was early and the treatment duration was specified in single patient.

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Conclusion: Diagnostic and therapeutic procedures of the PE at the cardiologic department of CNHU HKM by international recommendations are met but efforts are still needed regarding their optimal use.

Keywords: Benin; Diagnosis and therapeutic procedures; Pulmonary embolism

Introduction

Pulmonary Embolism (PE) is the most serious manifestation of Venous Thrombo Embolism (VTE). It was the subject of numerous papers aimed at better management [1-5]. In Africa and particularly in Benin, it is increasingly reported [6-10]. Its management is codified by international recommendations, including those made by the ESC in 2008 corresponding to our study period [11]. In order to improve our daily practice, we evaluate the use of diagnostic and therapeutic strategies of PE from the recommendations of the ESC in our cardiology department.

Patients and Methods

It was a retrospective descriptive study, conducted at the Cardiologic Department in Centre National Hospitalize et Universities Hubert Koutoukou MAGA (CNHU-HKM) of Cotonou. The study period extended from 1st September 2009 to 31st August 2014 were included all patients hospitalized with clinical suspicion of PE and those with a PE already documented before admission.

The PE was confirmed on the basis of the described international angio-CT scan criteria [11] or the association of clinical signs of PE and the presence of thrombus in the right cavities or in the pulmonary artery detected by Doppler echocardiography.

The PE was overturned on the basis of a pulmonary angiography or normal with the lack of sonographic signs of venous thrombosis and heart.

In patients admitted for clinical suspicion of PE, we evaluated the diagnostic procedures with respect to the recommendations of the ESC [11]. Initially we found the results of the assessment of clinical probability by the Wells score contained in patient records and we compared them to those recommendations of the ESC. Then the indication of a measurement of plasma D-Dimer (DD) was searched and its realization based on clinical probability was noted. A dosage of DD> 500 micrograms was considered contributory to the diagnosis of PE. In situations where the D-dimer were increased at baseline (infection, inflammatory condition, renal failure, pregnancy, cancer), no dosage was not considered in the diagnostic strategy for non-contributory.

Finally, the last step of this diagnostic procedure was the realization of the ASCP. We searched and this indication raised its realization in patient records that we compared to those recommendations of the ESC. The chronology of diagnostic tests performed (DD dosage, ASCP achievement, achievement of Doppler echocardiography)

consistent with the clinical probability was also sought and was based on the recommendations of the ESC [11]. In low or intermediate clinical probability, when the DD were made before the ASCP, the timing of clinical examinations was considered as respected. Otherwise, in the absence of bias factors when ASCP was achieved without the DD are made first, the timing was not well respected. In case of high clinical probability, when the DD are made prior to completion of the ASCP, the sequence of diagnostic tests was found not respected. In case of high clinical probability and realization of the ASCP without dosage of DD, the sequence of examinations was found as not respected. In the absence of hemodynamic instability, the clinical probability is low, intermediate or high, when Doppler echocardiography was performed first, the chronology was found not respected (but it is not about a lack of clinician).

In patients with confirmed PE, we evaluated the therapeutic procedures with respect to the recommendations of the ESC [11]. The stratification of the risk level, first step of the therapeutic management was relieved when it was evaluated in patient records. When evaluated, level of risk mentioned was noted and compared with the recommendations of the ESC [11]. In patients where the risk stratification level was not mentioned in their records, we reconstructed the level of risk in order to assess the compliance with the recommendations of the ESC [11] of the processing performed. The treatment carried out in line with the level of risk was also assessed by reference to the recommendations of the ESC [11]. The introduction of VKA treatment was considered premature when it was done in the first three days after confirmation of the PE.

For patients in whom PE was overturned, we evaluated initially, the invalidation procedures of the PE. After that, we assessed the intra hospital evolution after specific treatment corresponding to put alternative diagnosis.

The ASCP was performed on a helical scan type Siemens Somatom AR Star in a bar until 19th December 2013 or where a helical scanner SIEMENS SOMATOM Emotion 16 strips was commissioned. Data collection (sociodemographic, clinical, paraclinical, the successful diagnosis and the different elements of treatment) was made from the patient records on a computerized questionnaire; capture, statistical processing and analysis of our data was performed using the EPI INFO software version 7 Quantitative variables were expressed as mean with their standard deviation. For categorical variables, frequencies and proportions were determined.

Results

General characteristics of the study population and diagnostic aspects

A total of 206 patients were selected, while 164 showed clinical suspicion of PE and 42 documented a PE before admission. The diagnosis of PE was selected among 120 of them whose average age was 50 ± 16 years. The sex ratio was 2.4 for women. The prevalence of PE among 1970 patients hospitalized during the study period was 6.1%.

Evaluation of the diagnostic strategy

Assessment of clinical probability: Among 164 patients admitted for clinical suspicion of PE, the Wells score was evaluated in 138 patients, representing a compliance rate of 84.15%.

The method of assessment was consistent for 125 patients (90.58% of cases) with reference to the retail Wells score. Clinical probability was low in 35.5% of cases, intermediate in 53.6% and high in 10.8% of cases.

For the 13 patients (9.42%) in which the evaluation method did not comply, the clinical probability in four patients was overestimated, underestimated in five patients and identical in four patients. Coding errors related to tachycardia (listed at 1 instead of 1.5 - sometimes listed without exist - sometimes omitted) and the presence of signs of DVT (listed not exist).

Determination of D-dimer: The dosage of D-dimers indicated for 123 patients (49 patients with a low clinical probability and 74 patients with intermediate clinical probability is 89.13% of the cases) were performed in 85 patients is a compliance rate of 69.11%. This assay was contributory in 93% of cases and non-contributory in 7% of cases.

The reasons for non-completion were not found in 16 patients (13.01%). For others it was the existence of bias factors in 18 patients was 14.63% (infectious or inflammatory syndrome, renal failure, pregnancy and postpartum, age) - the financial limitation in four patients (3.25%).

In patients with a high clinical probability (15 patients) of the DD assay was still achieved in 4 patients (26.66% of cases) and the rate of plasma D-dimer was high. This is not in accordance with recommendations.

Realization of the ASCP: The ASCP was reported in 94 patients (79 patients with a low clinical probability and intermediate dosage with positive DD and 15 patients with a high clinical probability). It was conducted in 83 patients, representing a compliance rate of 88.30% and not performed in 11 patients (11.70%). It helped to establish the diagnosis in 60 patients. The reasons for not achieving the ASCP among 11 patients were renal failure (two cases); the technical impossibility (two cases); financial limitation (two cases); the Doppler echocardiography done first objectifying a thrombus in the right chambers or in the pulmonary artery (two cases); impairment of the general or unstable hemodynamic status (one case); pregnancy (one case); early death (one case). For the six patients with negative DD, both benefited from the completion of the ASCP was normal or non-compliance in 1/3 of cases.

There was also an overuse of ASCP in 33.33% of cases and underutilization in 11.70% of cases.

Final diagnosis retained: In total 206 patients included in the PE were confirmed in 58%, likely in 22% and 20% in overturned.

Cardiac Doppler Ultrasound necessary for risk stratification in 120 patients with confirmed PE was performed in 80 patients (66, 67%).

The reversal process was not observed in 60% of cases among 40 patients for whom the diagnosis of PE was not retained. The selected alternative diagnoses were pneumonia (14 cases); psychogenic dyspnea (05 cases); the pleuropneumopathies (04 cases); uncomplicated PE PST (03 cases); pleurisy (02 cases); chronic pulmonary heart disease with dyspnea post pulmonary tuberculosis outbreak (02 cases); gastritis (02 cases); parietal pain (02 cases); cardiomyopathy postpartum (02 cases); septic shock (01 case); pleuro-pericarditis (01 case); myocardial infarction and decompensated ischemic heart disease (01 cases each).

Therapeutic aspects evaluation

Evaluation of the therapeutic strategy in 120 patients with confirmed PE:

Stratification of risk level: The level of risk was assessed in only 32 patients (26.67% of cases). The risk level was average (50%), high (38%) and low (12%). This assessment was consistent with the recommendations in 87.5% of cases (28 patients). In the remaining 4 patients, the reasons for non-compliance were normal hemodynamic status, but ranked high risk patient due to the presence of thrombus in the right cavities with Doppler echocardiography (01 case) - classified patients medium risk while Doppler echocardiography was not performed (03 cases).

Among the 88 patients for whom risk stratification level had not been made, we reconstructed the level of risk. It was high in 02 patients (2.27%) and not higher in 86 patients (97.73%). In total in 120 patients, the risk was higher only in 5% of cases (6 patients).

For the 114 patients (95%) having a non-high-risk cardiac Doppler necessary for complete risk stratification level was achieved in 77 patients. Finally the corrected risk stratification was made for 83 patients (77 and 6 who have a high risk). In this group of 83 patients were intermediate risk (52%), low (41%) and high (7%).

Treatment: Thrombolysis was performed in 02 patients. The indication was represented by the existence of hemodynamic instability in one and the presence of thrombus in the right cavities coil in the other. The risk level is not high in the majority of cases (95%); heparin was the most used treatment. The treatment was carried out in line with the level of risk in 95% of cases (114 patients). In the remaining six cases, the reasons for non-compliance were the indication of thrombolysis but not performed because of financial limitation (02 cases), presence of hepatocellular carcinoma (01 case) and not available thrombolytic (01 cases) and finally no anticoagulant treatment started before death (02 cases); thrombolysis was indicated but not realized.

VKA were introduced in 92.50% of cases. VKA have not been introduced in nine patients (07.5%) for various reasons: anemia with hemoglobin <9 g (02 cases), early death (02 cases); liver failure (01 case), financial limitations to honor INR controls (01 case), waiting healing of a surgical wound (01 case), recent surgery (01 case) and bleeding externalized or not (hemothorax and intramuscular hematoma) (01 case). The duration of warfarin therapy was clarified in one patient and was consistent with the recommendations. This was a patient with a recurrent PE and the corresponding period was one year. In 99.10% of cases, it was not specified.

The early introduction of VKA with recommendations was consistent in 55.85% of cases (62 patients). The reasons for the delayed introduction of VKA in the remaining 49 patients were not specified (29 cases), spontaneous TP lowered base (05 cases), scheduled surgery (02 cases), achieving balance pending thrombophilia (02 cases) waiting for healing of a surgical wound (02 cases), basic non TP quickly honored (02 cases), anemia and lowered spontaneous 9g basic machinery (01 case), recent hemorrhagic stroke and planned hysterectomy (01 case), recent ischemic stroke (01 case) scheduled surgery and anemia 8g (01 case), recent surgery (01 case), ASCP belatedly realized (01 case) and etiological research of severe anemia 6g (01 case).

Evolution under treatment:

Evolution under treatment in 120 patients with confirmed PE.

The change was immediately favorable in 68.33% of cases (82 patients). A complication occurred in the remaining 38 patients was 31.67% (Table 1). The iatrogenic complications were represented by the occurrence of gastrointestinal bleeding (haematemesis, melena), hematuria, a hemothorax. Other complications were two in number worsening of normochromic normocytic anemia hemoglobin 9g to 6g without bleeding externalized and the occurrence of an ischemic stroke.

	Occurence	Frequency
Death	08	21.05
State of shock	0	0
Pulmonary infarction	22	57.90
Iatrogenic complications	06	15.79
Other complications	02	05.26
Total	38	100

Table 1: Complications occurred in 38 patients.

Evolution under treatment in patients with PE overturned

The in-hospital outcome was favorable in 87.5% of cases under specific treatment. In the remaining 12.5% all patients in number five had died. The causes of death were: unspecified 2 patients, septic shock, cardiogenic shock (due to a severe left ventricular dysfunction in a patient with ischemic heart disease) and metabolic disorders.

Discussion

120 of 1970 patients hospitalized in 5 years (6.1%) suffered from PE. This prevalence shows a marked increase in frequency of PE in our service. Indeed our team had reported a prevalence of 1.76% over a period of 8 years 5 months [6], close to the frequencies reported at that time in Africa (1.7% over 5 years [9] which was found). This prevalence may be higher because in 22% of patients studied our PE has been able to be objectively overturned.

Diagnostic aspects

Clinical probability: The Wells score of the evaluation deficit in nearly 16% of patients (a compliance rate of 84.15%) is unfortunate because the assessment does not require additional review and limit the cost of the diagnostic procedure.

Determination of DD: Compliance rate of 69.11% is encouraging because even though it is relatively accessible financially, it still costs more than 50% of the minimum wage. But cost is not the only factor in us as in some developed countries [12,13] that have a compliance rate sometimes less than 70%.

Insufficient knowledge of procedures can be discussed. It could also explain the dosage of D-dimer performed in 4 patients of the 15 who had a high clinical probability. It is causing unnecessary expenditure in patients with limited financial means.

Realization of the ASCP: Given its high cost makes more than 2 times the minimum wage, the compliance rate of 88.30% for the realization of the ASCP is encouraging. There is an evolving practice in relation to our first study [10] in which the ASCP was performed in 29.3% of patients. But overuse of ASCP in 33.33% of cases and underutilization of ASCP in 11.70% which we report indicate the need to further improve practices even if this perspective authors working in more

developed countries reported the same abnormalities sometimes in a less specialized medical settings such as emergency services: 90% of under-utilization and 10% overuse Anarson according to the US [13] 1/3 imaging performed for suspected preventable by Venkatesh EP [14] in the USA.

Elimination of the PE: While it is reassuring that 87.5% of patients in whom the diagnosis of PE was not selected had a favorable outcome with alternative treatment, we must remain cautious because the process was reversible ok that in 40% of cases. Only a medium to long-term monitoring of these patients could indicate the reliability of these exclusions and PE monitoring seems important given the high number of these patients (1 in 5).

Therapeutic Aspects

Stratification of risk level: It was found in the files assessed the level of risk only in 26.67% of cases (32 patients) of patients. But the treatment was carried out in line with the reconstituted risk level in 95% of patients. We hypothesize that in fact the level of risk was assessed in the majority of patients and that the apparent low rate of assessment of the risk level reflects mainly a transcript of omission.

Treatment management: Thrombolysis was performed because few non-medicals are many limiting factors, which demand a rise in social security and optimizing the supply of thrombolytic.

Anticoagulation with heparin was well conducted and vitamin K treating well leads to the hospital phase in accordance with the recommendations [11], and as reported by various authors as Kearon. [15] Finally it was found 16% of bleeding and a mortality of 21%. This high frequency of complications incites an optimization of the therapeutic.

Conclusion

The diagnostic and therapeutic conduct was good in most patients. But the assessment of clinical probability must be made better and more often. Also better use of D-dimer and pulmonary angiography is necessary for us more than elsewhere, since the cost of inappropriate procedures increases the financial burden already above the possibilities of a substantial proportion of patients.

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