Determinants Of Intracranial Hemorrhage In Patients With Atrial Fibrillation

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BACKGROUND. Available tools to predict intracranial hemorrhage (ICH) in patients with atrial fibrillation (AF) on antithrombotic therapy are largely criticized for the lack of sensitivity, specificity, and validity. We evaluated the predictive value of several clinical, radiological and laboratory parameters that could be more useful than HAS-BLED to estimate the risk of ICH in patients with AF.

METHODS. We conducted a case-control study on all patients with AF and ICH admitted to the Avezzano's Hospital between January 2011 and December 2013. A random sample of subjects matched for age and sex with AF without ischemic or hemorrhagic stroke hospitalized in the same period was selected to perform as the control group, with a ratio of two controls per case. All patients underwent the same evaluation protocol. Patients without neuroimaging exams were excluded.

RESULTS. During the study period we identified 37 subjects with AF and ICH. 74 subjects with AF and without stroke events were randomly chosen as controls. Among cases 56.8% were female with mean age was of 83.1 years **(Table 1)**. There was no significant difference between the two groups regarding demographic and clinical parameters **(Figure 1)**.

Table 1. Characteristics of population study

	Controls n. %	Intracranial Hemorrhage n. %	p < 0.05
Age (n ± DS)	83.73 ± 6.48	83.1 ± 6.4	**0.74**
Female Sex	43 57.3	21 56.8	**0.99**
Smoke	16 21.6	2 5.6	**0.10**
Alcohol	2 2.7	0 0	**0.23**
Diabetes	23 30.7	11 29.7	**0.95**
Hypertension	44 59.4	16 43.2	**0.18**
Previous Stroke	20 26.7	7 18.9	**0.47**
AF Paroxysmal Permanent Persistent	11 14.7 11 14.9 1 2.7	55 73.3 52 70.3 31 83.8	**0.36**
Heart Failure, NYHA class (n ± DS)	2.33 ± 0.86	1.42 ± 1.24	**<0.0001**
HASBLED (n ± DS)	2.34 ± 0.53	2.4 ± 0.68	**0.86**
CHADS2VASC2 (n ± DS)	1.83 ± 2.18	1.62 ± 2.03	**0.89**

Controls had a lower ejection fraction probably because heart failure represented the reason of the admission. No significant differences were found in laboratory data, with the exception of clotting parameters **(Figure 2)**.

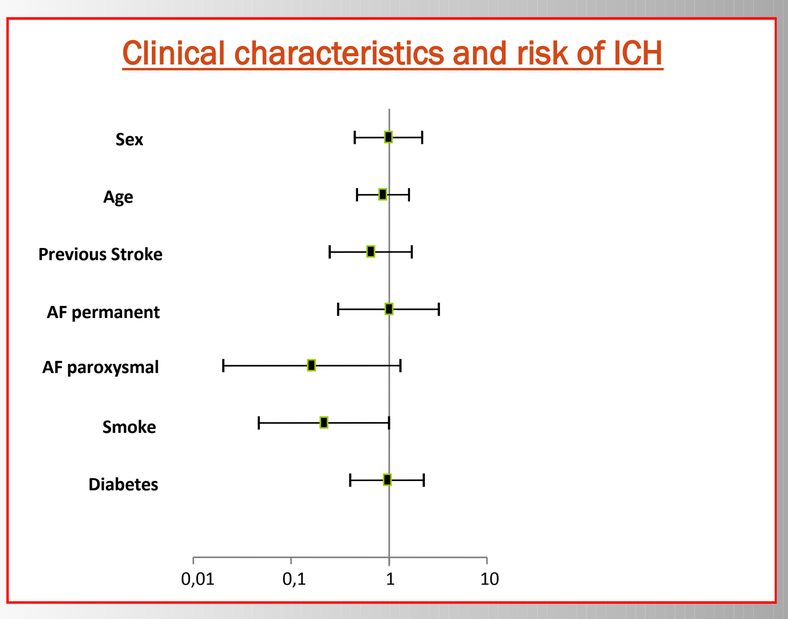

Figure 1

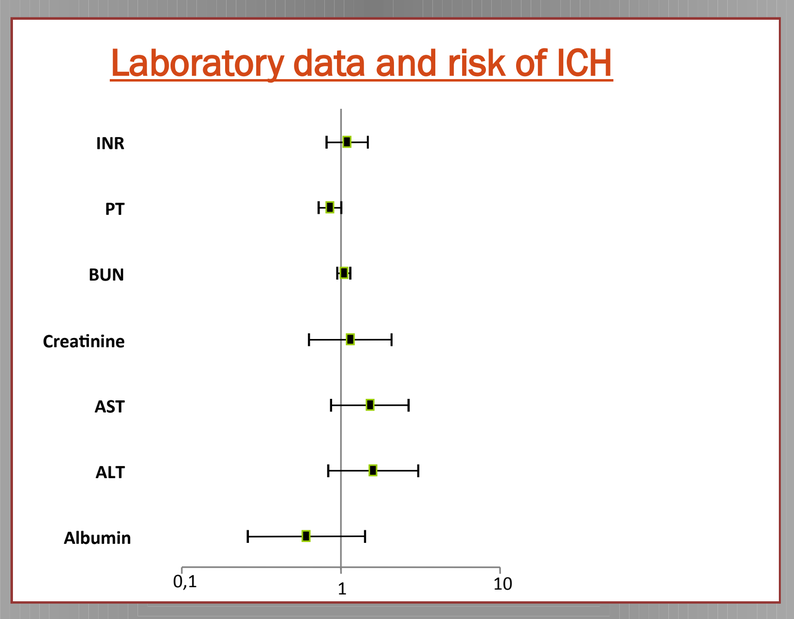

Figure 2

Patients with ICH were more often on OAC therapy (75.7%), compared with controls (45.9%; p = 0.0002). No differences were identified for the other drugs **(Figure 3)**.

On CT scans, cases had a greater severity of leukoaraiosis at the Blennow scale **(p <0.0001)**, and a higher frequency of lacunar infarcts **(p = 0.006)**. No significant association was found between MRI parameters, probably for its low specificity, and the occurrence of ICH **(Figure 4)**.

One possible explanation for this data is that ischemia itself may promote eventual vascular rupture, with the onset of microhemorrhages that may enlarge to clinical overt hematoma in patient on OAC therapy.

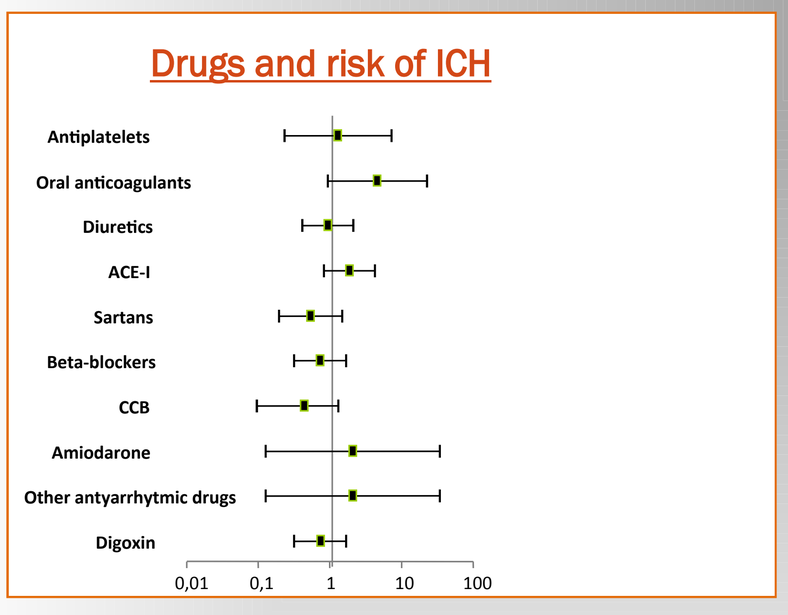

Figure 3

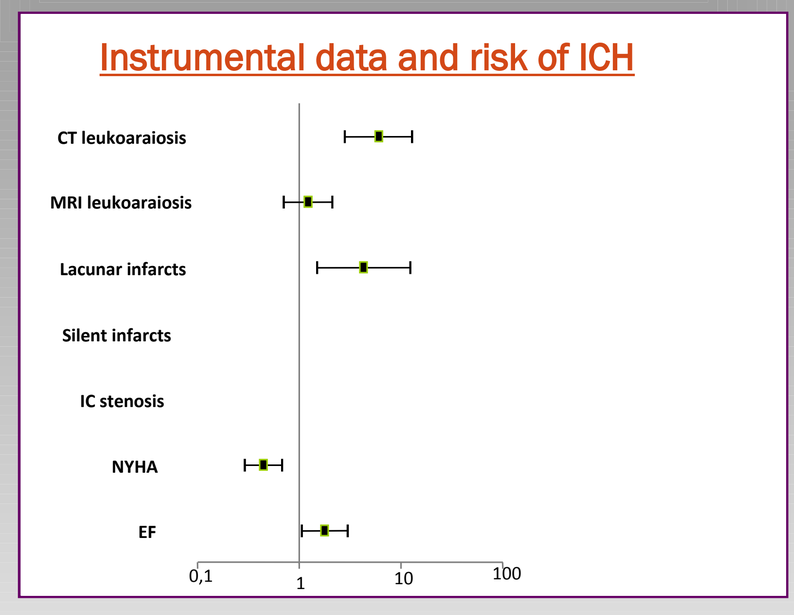

Figure 4

CONCLUSION. CT scan is more useful than MRI and HASBLED score to predict ICH in patients with AF on antithrombotic therapy. The severity of leukoaraiosis and the presence of lacunar infarcts have proved to be valid predictors of ICH in patients with AF.