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Imaging protocol of stroke at moulins-yzeure hospital center about 101 cases

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Abstract
Ischemic stroke is a serious and frequent disease. The goal of our study was to assess an imaging protocol for stroke exploration at Moulin Hospital in order to suggest it to other radiologists. It was is a retrospective descriptive study of 101 case series, during a period of 3 months, of all patients sent to our radiology unit for suspicion of acute stroke. Patients mean age was 65 years old. A neurological impairment was found in 80% of cases and 43% had other neurological signs. Time to brain imaging was less than 6 hours in 35% of cases. And in less than 24 hours, 65% underwent a computed Tomography Angiography of head and neck vessels, brain MRI was done in the first week of stroke in 26%. Ninety eight brain CT Scans, 52 brains MRI and 76 CTA of supra-aortic trunks and Willis polygon were done. Brain CT scan and MRI showed respectively constituted ischemic lesion in 16% and 36%, hemorrhagic in 7% and 6%. However76% had no lesion on CT scan versus 57% on MRI. Six patients had significant carotid stenosis. Transfer in a Stroke unit was needed for 7 patients of whom one had thrombolytic therapy. Decreasing time to brain imaging and brain and neck's arteries CTA of patients with stoke, decrease hospitalization length of stay, complications and improve prognosis.

Keywords: brain CT scan CT Angiography, delay, MRI, protocol, stroke

Introduction
Stroke is a public health problem. It's a serious disease, which needs an urgent care. Brain MRI and CT scan are crucial exam for establishing its diagnosis. This study assessed an imagery protocol for stroke exploration at Moulins-Yzeure Hospital center in order to suggest it to other radiologists.

2. Material et methods
It is a cross sectional retrospective descriptive study during3 months, from May first to July 31, 2017, at the radiology department of Moulins-Yzeure Hospital center. All patients sent to the radiology department for stroke pathway were included. We excluded patients sent directly to MRI for thrombolytic alert and transferred urgently a stroke unit or patients who had directly an MRI for stroke suspicion and did not have a supra-aortic trunks exploration at our department. Recruitment was done among patients sent by Allier SAMU, passing by emergency department or admitted at Moulins-Yzeure hospital center. Studied parameters were clinical and radiological data.

Explorations were done on 1,5 Tesla Siemens MRI with pondered sequences in resolve diffusion, ADC cartography, SWI, FLAIR, T1 and a 3D TOF or a MRA of Willis polygon. CT Scans were done on Philips device with 64 detectors realizing an acquisition on spontaneous enhancement from axis to vertex and an acquisition with injection of iodinated contrast from the aorta arc to distal branches of cerebral arteries. An automatic injector with 50cm ^{3}of iodinated contrast followed by 90cm^{3}of isotonic saline with a debit of 5cm^3/second was used for CT Angiography of supra-aortic trunks and Willis polygon. The tracker was positioned on aorta ascendens with 1,5cm thickness of slice, voltage of 120KV, 170mAs / 377mA intensity ended by multi-planar reconstructions. Imagery exam report was written and diffused on in-hospital informatics network via Windows Internet Explorer software. Images were sent in an inter-hospital network to obtain neurologists and neurosurgeons opinions.

3. Results
After consultation of patient records', 101 patients had a brain CT scan or a Brain MRI. Patients who were more than 60 years old were 74% with a mean age of 65,8 [16 ; 97] years old, with 47 males and 56 females, sex ratio of 0,8.

On clinical exam, 81% had neurological impairment (fig. 1). Time between onset of signs and hospital arrival was 6 hours in

35%, more than 6 hours in 58% and appeared when waking up in 7% of cases.
On radiological view, 98 Brain CT scan, 52 Brain MRI and 76 supra-aortic trunks and Willis polygon CTA were done (fig. 2). MRI and CT scans showed respectively ischemic lesions (fig. 3) in 16% and 36% of cases ; hemorrhagic in 7% and 6% of cases. While 76% did not have lesions on CT scan versus 57% on MRI. On supra-aortic trunks CTA, 21% had carotid stenosis and 4% of them very tight (fig. 4) and 4% moderately tight. Only one patient had an ischemic lesion of less than 6 hours on MRI.
The mean of DLP (Dose Length Product) was 1517 mGy.cm with extreme of 834mGy.cm and 4332 mGy.cm. the mean DLP of patients who did only Brain CT scan without injections was954 mGy.cm and 2252 mGy.cm for those who had injection.
Après l'examen d'imagerie, 2% ont été décédé, 2% étaient sortis contre avis médical, 1% avait eu une thrombolyse, 6% étaient évacués à l'unité neuro-vasculaire et 90% ont été hospitalisé.

4. Discussion

According to WHO, stroke is defined as a rapid development of localized or generalized clinical sign of brain dysfunction with symptoms lasting more than 24 hours, and can lead to death, without any other apparent causes than a vascular origin[1]. TIA is defined as a sudden neurological signs, of vascular origin, regressing spontaneously in less than 1 hour, without any sequel or lesions on Brain imagery [2]. It is the first cause of acquired handicap [3]. In France, its annual incidence is 1,6 to 2,4/1000 all ages confounded, it means1 stroke every 4 minutes[4]. While this study showed 1 or 2 strokes per day. Stroke frequency increases with age [5], without any gender difference [6].
In clinical point of view, sensory motor neurological impairment followed by language and consciousness problem is conformed to other studies [7].
In radiological point of view, l'OPEPS (Office Parlementaire d' Évaluation des Politiques de Santé or Parliamentary Office for the Evaluation of Health Policies) investigation in their 2007 report about stroke management showed a mean time to brain imagery of 150 minutes [8]. Since HAS recommendation in 2009[9], patients who presented a thrombolytic alert had a brain MRI followed by vascular exploration urgently during MRI hours availability. Apart from those hours, patients had brain CT scan followed by CTA of head and neck arteries urgently. While, patients with stroke who exceeded thrombolytic delay or with thrombolysis contra-indication had immediately a brain CT scan without injection to exclude an intra-cranial bleeding or for searching for early signs of ischemic stroke. After that those patients take appointment for Doppler echo or MRA to explore their supra-aortic arteries. Appointment delay was 1 to 2 weeks; clinicians were obliged to immobilize their patients who had stroke until a proof of a good permeability of neck and head arteries was given. According Canadian recommendations in 2015, in triage of TIA/Minor stroke, patients with motor impairment and trouble of elocution had a high risk for recurring and must be managed as early as possible and vascular imagery of extra-cranial and intra-cranial vessels must be prioritized[10].
Since the beginning of this study, the Moulins-Yzeure Hospital Center decreased the time to exploration of cervico-cephalic arteries by realization of a CTA of brain and neck 24 to 48 hours of hospital arrival. For diminishing a prolonged bed rest and hospitalization length of stay, to start physiotherapy as early as possible.
However, the addition of a CTA of neck and brain inside the stroke protocol majored the risk of irradiation. As part of radioprotection, an improvement of access of non irradiant exam will be necessary for exploring supra-aortic trunks.

5. Conclusion

This study shows certain strong points of our stroke pathway, in particular, the shortening of the time to neck and brain arteries imagery realization for stroke in acute stage as well as for brain infarct or TAI for decreasing the hospital length of stay, diminishing stroke complication and improve the prognosis. It shows collaboration effort between emergency and radiology team too to respect the last recommendations about stroke management or for adequate management of patients.
Some points remain to be improved, in particular, the time to MRI realization and the Doppler echo In order to limit X ray irradiation side effects.

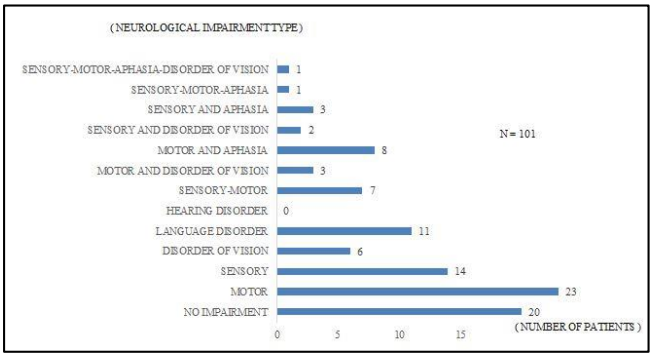

Fig 1: repartition according neurological impairment type

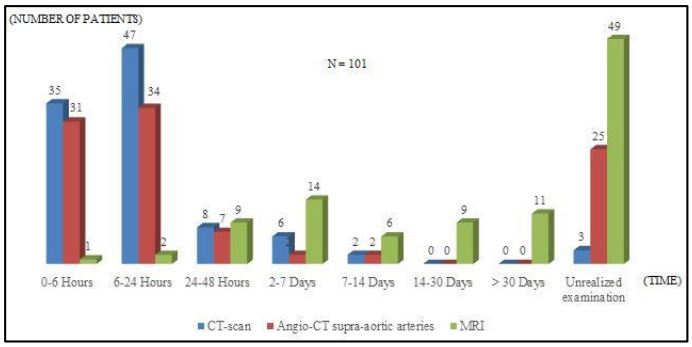

Fig 2: Repartition of cases according the time between the neurological sign onset and the brain imaging realization

Fig 3: Axial coupe of a brain CT scans showing early signs of ischemic stroke: spontaneous hyperdensity of right middle cerebral artery (arrow)

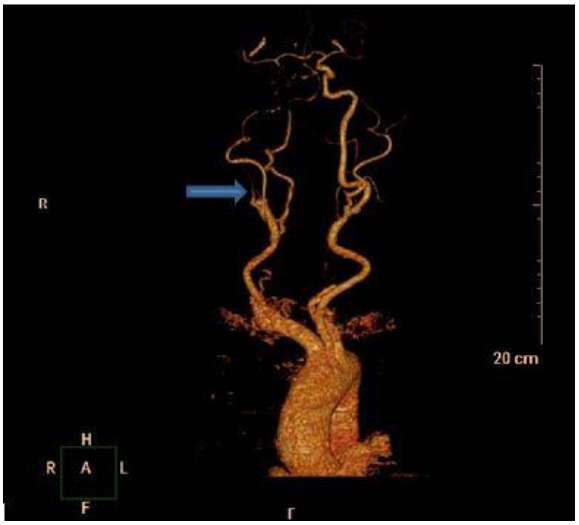

Fig 4: Reconstruction 3D of supra-aortic trunks CTA with stenosis of the right carotid artery (arrow)

References

1. Mackay J, Mensah G. L'atlas des maladies cardiovasculaires et des accidents vasculaires cérébraux 2004. Disponible sur http://www.who.int/card iovascular_diseases/ ressources / Atlas.
2. Flamand-Roze C, Roze E, Denier C. Troubles du langage et de la déglutition à la phase aiguë des accidents vasculaires cérébraux : outils d'évaluation et intérêt d'une prise en charge précoce. Revue neurologique (2012); 849; Pages 10
3. Murray CJ, Lopez AD. Mortality by cause for eight regions of the world: Global Burden of Disease Study.Lancet. 1997 May 3 et 349(9061):1269-76
4. Bejot Y, Rouaud O, Benatru I, Fromont A, Couvreur G, Caillier M, Gentil A, Osseby GV, Lemesle M, Decavel P, Medeiros E, Moreau T, Giroud M. Contribution of the Dijon Stroke Registry after 20 years of data collection. Rev Neurol (Paris). 2008 ; 164(2):13.
5. Sene-Diouf F, Basse AM, Ndiaye1 M, Touré K, Diop MS, Thiam A et al. Prise en charge des accidents vasculaires cérébraux au Sénégal. Rev Neurol. 2007: 63(8):823-7.
6. Rachdi L, Toudou M, Bouchal S, Belahsen MF. Étude prospective sur les accidents vasculaires cérébraux ischémiques, expérience du service de neurologie de CHU HASSAN II Fès à propos de 400 cas. Rev Neurol. 2015 ; 39, 171:1.
7. Razafindrasata RS,Rasaholiarison NF, Razafimahefa J,Tehindrazanarivelo AD. Profil évolutif des déficits moteurs chez des patients atteints d'accident vasculaire cérébral au service de neurologie du CHU Befelatanana, Antananarivo. Med Sante Trop 2017; 27:421-425.
8. Schmidt NK, Hüwel J, Weisner B. Causes of a prolonged prehospital phase in patients admitted to a stroke unit. Can it be influenced by campaigns to educate the public?. Nervenarzt. 2005; 76(2):181-5.
9. Accident vasculaire cérébral : prise en charge précoce (alerte, phase préhospitalière, phase hospitalière initiale, indications de la thrombolyse). HAS / Service des bonnes pratiques professionnelles / mai 2009. P62. Disponible sur http://www.sfmu.org
10. Coutts SB, Wein TH, Lindsay MP, et al. Canadian Stroke Best Practice Recommendations: secondary prevention of stroke guidelines, update 2014. Int J Stroke. 2015; 10(3):282-291.