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Delayed cerebral infarction after aneurysmal subarachnoidhemorrhage: a before-after study of real-life practices.

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Position du problème et objectif(s) de l'étude:
Delayed cerebral infarction (DCI) after subarachnoid hemorrhage (SAH) has a more complex physiopathology than a continuum emerging from vasospasm (1). Milrinone may be an alternative treatment of DCI due to its vasodilatory, inotropic, and anti-inflammatory capabilities (2). In 2017, our practice has changed to include early perfusion CT-scans follow-up and widespread continuous intravenous Milrinone infusion. This study seeks to assess the effect of these changes on the rate of DCI.

Matériel et méthodes:
This retrospective monocentric study included adults who had suffered from aneurysmal SAH and admitted in Montpellier University Hospital. The study was conducted in 2 distinct periods: before (2014-2016) and after (2018-2021) practices modifications. It was approved by our Institutional Review Board. Patients or their families were informed of the study and could choose to opt out. To analyze patient's records, standardized definitions were used. Vasospasm was defined by angiographic evaluation. "Delayed clinical deficit" (sudden focal/global neurological impairment) and "delayed cerebral infarction" (presence of cerebral infarction on CT/MR scan not present 48-72h after aneurysmtreatment and not attributable to other causes) were differentiated. The population characteristics of the groups "before" and "after" practices modifications were compared with appropriate statistical tests. Logistic regression was used to evaluate DCI risk factors and the effect of our practice's changes.

Résultats & Discussion:
279 patients were admitted during the "before" period and 457 patients "after". Fisher score III/IV represent respectively 64% and 76% of patients ($p < 0.001$), WFNS III/IV/V 41% and 47% of them ($p=0.12$). Vasospasm was more frequently and earlier diagnosed during the "after" period (42% vs 57%, $p < 0.001$ and 5.7 days vs 4.8 days, $p=0,044$). Among 380 vasospasms, intravenous Milrinone was used in 54% of cases "before" and 81% "after" ($p < 0.001$). Intra-arterial Milrinone use was not different, and rescue angioplasty was scarcer in the "after" group (16% vs 6.5%, $p=0,003$). Without adjustment, high Fisher score ($p=0.007$), high WFNS ($p<0.001$) and occurrence of vasospasm ($p<0.001$) were related to DCI. For the multivariate analysis, a backward variable selection was performed including occurrence of vasospasm, WFNS, Fisher scores and period type variables. After adjusting for the remaining variables, practices modifications were associated with a reduced DCI rate (OR=0.43, 95% CI [0.28, 0.68]).

Conclusion:
In this monocentric retrospective before-after study of 736 patients suffering from aneurysmal SAH,we analyzed practice's changes in real-life conditions. We highlighted a recent widespread use of intravenous Milrinone infusions in our center, and an impact on the delay and the proportion of vasospasm diagnosis. It appears that our practice's changes reduced DCI occurrence in SAH patients. We suggested the potential interest of perfusion CT scan follow-up, which allows for a quicker and efficient evaluation of vasospasm consequences, and the benefit of continuous intravenous Milrinone use to prevent DCI.

Références bibliographiques:
(1) - Rowland et al. Delayed cerebral ischaemia after subarachnoid haemorrhage: looking beyond vasospasm. BJA. 2012 (2) Castle-Kirszbaum et al. Intravenous milrinone for treatment of delayed cerebral ischaemia following subarachnoid hemorrhage. Neurosurgical Review. 2021

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