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REVIEW

The left atrial septal pouch as a risk factor for stroke: A systematic review

La poche septale atriale gauche comme facteur de risque embolique : une revue systématique

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KEYWORDS

Left atrial septal pouch;
Ischaemic stroke;
Cryptogenic stroke;
Intra-atrial thrombus

Summary The left atrial septal pouch (LASP) is formed by incomplete fusion of the septum primum and septum secundum, leaving a cavity open towards the left atrium, but without interatrial shunting. There is no recommendation concerning strategy in the presence of a LASP, especially in the setting of stroke. The aim of this review was to determine whether the LASP could be incriminated as the aetiology of a stroke. We included all pertinent publications on the subject, and calculated hazard ratios for ischaemic stroke and cryptogenic stroke. There were only five case–control studies concerning the LASP, involving 516 stroke patients and 779 controls. Overall LASP prevalence was 21%, with a slightly higher prevalence in the cryptogenic stroke group (26%), but this difference was not statistically significant ($P=0.27$). In a random-effects meta-analysis, there was no difference between controls and patients with ischaemic stroke (hazard ratio 1.20, 95% confidence interval 0.96–1.53; $P=0.14$). Cryptogenic stroke appeared more frequently in patients with LASP (hazard ratio 1.53, 95% confidence interval 1.07–2.24; $P=0.02$), but this was driven by only one severely underpowered study. The published case reports demonstrated that thrombus formation inside the pouch can occur in the presence of major predisposing factors. The LASP can be a site for thrombus formation, leading to embolic events, but its presence does not correlate with an increased incidence of

Abbreviation: LASP, left atrial septal pouch.

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stroke. Associated factors should be taken into consideration in the setting of stroke. Further studies are necessary to validate a possible relationship with cryptogenic stroke.

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MOTS CLÉS

Poche septale atriale gauche ;
Accident vasculaire cérébral ischémique ;
Accident vasculaire cérébral cryptogénique ;
Thrombus intra atrial

Résumé La poche septale atriale gauche (LASP) est formée par une fusion incomplète du septum primum et du septum secundum. Il n'y a pas de recommandation concernant la conduite à tenir en présence d'un LASP dans le cadre d'une embolie. Le but de cette revue est de déterminer s'il est possible de l'incriminer comme étiologie d'un accident vasculaire cérébral ischémique (AIC). Nous avons inclus toutes les publications pertinentes sur le sujet et calculé les rapports de risque d'AIC et AIC cryptogénique. Il y a seulement cinq études cas-témoins concernant le LASP, totalisant une population de 516 patients d'AIC et 779 contrôles. La prévalence globale du LASP était de 21 %, avec une prévalence légèrement plus élevée dans le groupe AIC cryptogénique (26 %), mais cette différence était statistiquement non significative ($P=0,27$). Selon notre méta-analyse il n'y avait pas de différence entre les témoins et les patients souffrant d'AIC (HR 1,20, IC 95 % 0,96–1,53 ; $P=0,14$). Les AIC cryptogéniques semblaient plus fréquentes chez les patient ayant un LASP (HR 1,53, IC 95 % 1,07–2,24 ; $P=0,02$), mais cette tendance est influencée par une seule étude de très faible puissance statistique. Les cas déjà publiés démontrent qu'un thrombus peut se former dans la poche en présence des facteurs prédisposants. Le LASP pourrait être un site favorisant la thrombogénèse, mais n'est pas associé à l'augmentation du risque d'AIC. Les facteurs associés doivent être pris en considération dans le contexte d'embolie artérielle. D'autres études sont nécessaires pour valider une possible relation avec les AIC cryptogéniques.

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Background

The fusion of the interatrial septum was initially thought to be homogenous all along the coaptation line. The absence of fusion of the completely developed septum primum and secundum defines the presence of a patent foramen ovale [1]. It was recognized surprisingly late that this fusion may just be incomplete, leading to the appearance of pouch-like structures on either side of the interatrial septum (Fig. 1). The left atrial septal pouch (LASP) was described in 2010 by Krishnan and Salazar [2]. From the beginning, there was concern regarding the potential for thrombogenesis inside this pouch [3]. It is possible that in certain conditions the LASP behaves like the left atrial appendage, presenting a risk for embolic events. Unlike the appendage, this pouch has no contractility of its own, being formed almost exclusively from fibrous structures [4]. Fortunately, its cranial opening is directly in the way of the flow coming from the right upper pulmonary vein (Fig. 1), which may facilitate a washing mechanism, preventing local stasis and clot formation [5].

Several reports have demonstrated the presence of thrombi in the LASP, mostly in the setting of factors that can be assimilated into the classical triad of Virchow: atrial fibrillation, left ventricular dysfunction and procoagulable state. Despite these findings, later in 2010, Tugcu et al. showed an absence of evidence for an association between stroke and the presence of LASP [6].

There is no clear recommendation regarding strategy in the presence of a LASP, especially in the setting of a

cryptogenic stroke. The aim of this review was to determine whether we possess sufficient information to incriminate this anatomical structure as the aetiology of a stroke, or should simply discard it as an innocent bystander.

Methods

This systematic review was conducted in accordance with Meta-analysis Of Observational Studies in Epidemiology (MOOSE) guidelines [7]. We planned to include studies of the relationship between the LASP and stroke in adults. Studies were included if they reported at least one of the following: a relationship between a septal pouch and embolic events (stroke), a septal pouch and local thrombus formation or a septal pouch and cryptogenic stroke. We excluded studies only published as abstracts, reviews and duplicate reports of the same study.

We searched the following databases: PubMed (National Library of Medicine, National Center for Biotechnology Information); and EMBASE. The following search terms were used: "atrial pouch"; "septal pouch"; "atrial thrombus"; "septal thrombus"; and "septal pouch stroke". We also checked manually the reference lists of all relevant papers to identify any studies that might have been overlooked by the automated search. Only studies in English were considered. The last search was performed on 25 October 2016. The studies were screened independently by two investigators (M. S. and J. C.-R.), based on title and abstract. The

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