Protocole National de Diagnostic et de Soins

Syndrome des Anti-Phospholipides de l'adulte et de l'enfant

2022

Ce PNDS a été rédigé sous l'égide de :

Centre de référence du lupus, syndrome des anticorps anti-phospholipides et autres maladies auto-immunes rares

Et du

Centre de référence des rhumatismes inflammatoires et maladies auto-immunes systémiques rares de l'enfant RAISE

Et de la

Filière des maladies auto-immunes et auto-inflammatoires rares FAI²R

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Déclarations d'intérêt

Tous les participants à l'élaboration du PNDS ont rempli une déclaration d'intérêt. Les déclarations d'intérêt sont en ligne et consultables sur le site internet du(des) centre(s) de référence.

Objectifs du protocole national de diagnostic et de soins

L'objectif de ce protocole national de diagnostic et de soins (PNDS) est d'exposer aux professionnels concernés la prise en charge diagnostique et thérapeutique optimale actuelle et le parcours de soins d'un patient atteint de SAPL. Il a pour but d'optimiser et d'harmoniser la prise en charge et le suivi de cette maladie rare sur l'ensemble du territoire.

Il permet également d'identifier les spécialités pharmaceutiques utilisées dans une indication, mais non prévues dans l'autorisation de mise sur le marché (AMM) ainsi que les spécialités, produits ou prestations nécessaires à la prise en charge des patients mais non habituellement pris en charge ou remboursés.

Ce PNDS peut servir de référence au médecin généraliste en concertation avec les autres médecins spécialistes.

Le PNDS ne peut cependant pas envisager tous les cas spécifiques, toutes les comorbidités ou complications, toutes les particularités thérapeutiques, tous les protocoles de soins hospitaliers... Il ne peut donc pas revendiquer l'exhaustivité des conduites de prise en charge possibles, ni se substituer à la responsabilité individuelle du médecin vis-à-vis de son patient. Cependant, le PNDS décrit la prise en charge de référence actuelle d'un patient atteint de SAPL. Il sera mis à jour en fonction des nouvelles données validées.

Le présent PNDS a été élaboré selon la « Méthode d'élaboration d'un protocole national de diagnostic et de soins pour les maladies rares » publiée par la Haute Autorité de Santé en 2012 (guide méthodologique disponible sur le site de la HAS : www.has-sante.fr).

Méthode de travail

Le présent PNDS a été élaboré selon la « Méthode d'élaboration d'un protocole national de diagnostic et de soins pour les maladies rares » publiée par la Haute Autorité de Santé en 2012 (guide méthodologique disponible sur le site de la HAS : www.has-sante.fr).

Une réunion de mise en place en visioconférence avec les coordinateurs a permis de déterminer le plan du PNDS, la liste des rédacteurs pour chacune des parties/spécificités du PNDS ainsi que la liste des relecteurs.
Durant la phase de rédaction, chaque groupe de rédacteurs a réalisé une analyse de la littérature en langue anglaise et française avant de rédiger la partie du PNDS correspondante.
A l'issue de la rédaction, toutes les parties du PNDS ont été assemblées puis homogénéisées par les coordinateurs.
Durant la phase de relecture, chacun des rédacteurs et relecteurs a commenté la première version du PNDS.
A l'issue de la relecture, les coordinateurs ont pris en compte tous les commentaires pour produire la deuxième version du PNDS.
Deux demi-journées de finalisation se sont enfin tenues (en visioconférence), où tous les rédacteurs et relecteurs étaient conviés, afin de refaire une revue complète et collégiale du texte pour en produire une version finalisée à publier.

Tableau 1. Recommandations de bonne pratique

Auteur, année, référence, pays	**Objectif**	**Stratégie de recherche bibliographique renseignée (Oui / Non)**	**Recueil de l'avis des professionnels (Oui / Non ; Lesquels)**	**Recueil de l'avis des patients (Oui / Non)**	**Populations et techniques (ou produits étudiés)**	**Résultats (avec grade des recommandations si disponible)**
Miyakis, 2006, (2), USA	Consensus international sur la mise à jour des critères de classification du SAPL	Oui	Groupe d'experts	Non	Oui	We propose amendments to the Sapporo criteria. We also provide definitions on features of APS that were not included in the updated criteria.
Devreese, 2020, (4)(29), International	Mise à jour des recommandations de détection de l'ACCL	Non	Groupe d'experts	Non	Oui	Cutoff values should be established in-house on at least 120 normals, with transference of the manufacturer's cutoffs as an alternative. Reporting of results has not been changed, although more attention is focused on what clinicians should know. Patient selection for LA testing has been expanded.

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Tektonidou, 2019, (17) (44), Européen	Recommandations EULAR sur la prise en chrage du SAPL	Oui	Groupe d'experts	Non	Oui	Recommandations sur la prise en charge du SAPL chez l'adulte
Tripodi, 2016, (18), International	Recommandations sur le suivi des patients ACCL sous AVK	Non	Groupe d'experts	Non	Oui	Recommandations sur le suivi des patients ACCL sous AVK
Barbhaiya, 2021, (22), International	Processus d'élaboration de nouveaux critères de classification SAPL	Oui	Groupe d'experts	Non	Oui	Using data- and consensus-driven methodology, we identified 27 APS candidate criteria in 6 clinical or laboratory domains. In the next phase, the proposed candidate criteria will be used for real-world case collection and further refined, organized, and weighted to determine an aggregate score and threshold for APS classification.

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Asherson, 2003, (52), International	Consensus international de prise en charge du CAPS	Non	Groupe d'experts	Non	Oui	Anticoagulation (usually intravenous heparin followed by oral anticoagulants), corticosteroids, plasma exchange, intravenous gammaglobulins and, if associated with lupus flare, cyclophosphamide, are the most commonly used treatments for catastrophic APS patients.
Cervera, 2011, (57), International	Recommandations internationales sur le CAPS	Oui	Groupe d'experts	Non	Oui	This article summarizes the studies analysed on catastrophic APS, APS nephropathy and heart valve lesions, and presents the recommendations elaborated by the Task Force after this analysis.

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Erkan, 2010, (62), USA-Espagne	Algorithme diagnostique	Oui	Groupe d'experts	Non	Oui	The goal of the updated catastrophic APS diagnostic algorithms is to provide a "step-by-step" approach to clinicians (and researchers) while assessing patients with multiple organ thromboses.
Groot, 2017, (85), International	Recommandations internationales sur le SAPL pédiatrique	Oui	Groupe d'experts	Non	Oui	The SHARE initiative provides international, evidence-based recommendations for diagnosis and treatment for children with APS and thereby facilitates improvement and uniformity of care.

Tableau 2. Revues systématiques de la littérature

Auteur, année, référence, pays	Objectif	Méthodologie, niveau de preuve	Population	Intervention	Critères de jugement	Résultats et signification
Bernardoff, 2022, (3), France-USA	aPL et risque d'AHAI au cours du LS	Oui	Oui	NA	Oui	The occurrence of hemolytic anemia was strongly associated with presence of aPL in SLE patients. Interestingly, IgM isotypes indicate an increased risk of hemolytic anemia in SLE.
Joste, 2018, (8), France	Diagnostic biologique du SAPL: des critères à la pratique	Non	Oui	NA	Non	Cette revue décrit les différents types d'anticorps antiphospholipides, la relation entre profil biologique et risque thrombotique et aborde les aspects pratiques de l'interprétation des tests biologiques.
Ruiz-Irastorza, 2010, (15), International	SAPL	Non	Oui	NA	Non	Mise au point sur le SAPL
Abdel-Wahab, 2018, (19), USA	Risque de développement d'aPL après infection virale	Oui	Oui	NA	Oui	Viral infection can increase the risk of developing elevated aPL antibodies and associated thromboembolic events. Results are contingent on the reported information.
Foret, 2021, (33), France	aPL et C OVID	Oui	Oui	NA	Oui	Prevalence of Lupus Anticoagulant (LA) ranged from 35% to 92% in ICU patients. Anti-cardiolipin (aCL) IgG and IgM were found in up to 52% and up to 40% of patients

Auteur, année, référence, pays	Objectif	Méthodologie, niveau de preuve	Population	Intervention	Critères de jugement	Résultats et signification
						respectively. Anti-β2-glycoprotein I (aβ2-GPI) IgG and IgM were found in up to 39% and up to 34% of patients respectively. Between 1% and 12% of patients had a triple positive aPL profile. There was a high prevalence of aβ2-GPI and aCL IgA isotype. Two cohort studies found few persistent LA but more persistent solid phase assay aPL over time.
Sammaritano, 2021, (41), USA	Contraception au cours du SAPL	Non	Oui	NA	Non	Studies support very low risk for most progestin-only contraceptives in patients with increased thrombotic risk, but suggest increased VTE risk with depot-medroxyprogesterone acetate. Highest efficacy contraceptives are intrauterine devices and subdermal implants, and these are recommended for women with aPL/APS. Progestin-only pills are effective and low risk. Perimenopausal symptoms may be treated with nonhormone therapies in aPL/APS patients: vasomotor symptoms can improve with nonhormonal medications and cognitive behavioral therapy, and genitourinary symptoms often

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						improve with intravaginal estrogen that has limited systemic absorption.
Ünlü, 2016, (45), USA-France	Signification clinique des aPL au cours du LS	Non	Oui	NA	Non	Compared with SLE patients without aPL, SLE patients with aPL have a higher prevalence of thrombosis, pregnancy morbidity, valve disease, PH, LR, thrombocytopenia, hemolytic anemia, acute/chronic renal lesions, and moderate/severe cognitive impairment; worse QoL; and higher risk of organ damage.
Cervera, 2014, (59), International	Mise au point sur le CAPS	Non	Oui	NA	Non	The objectives of this Task Force were to assess the current knowledge on pathogenesis, clinical and laboratory features, diagnosis and classification, precipitating factors and treatment of CAPS in order to address recommendations for future research.
Rodriguez-Pinto, 2015, (70), Espagne	Rituximab et CAPS	Non	Non	NA	Non	In selected patients, new therapies such as rituximab may be a treatment option. In this review, the rationale for using rituximab in CAPS is discussed.

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Uthman, 2007, (76), Liban et Grande Bretagne	Atteintes abdominales du CAPS	Oui	Oui	NA	Oui	A high index of suspicion for any signs of abdominal involvement should be considered in patients with APS. In addition screening for aPL should be carried out in patients who present with hepatic vein occlusion and unexplained signs of intestinal angina.
Rosina, 2021, (94), Italie	SAPL pédiatrique	Non	Non	NA	Non	As a whole, the knowledge of the multifaceted nature of pediatric APS should be implemented to further reduce the risk of underdiagnosing or undertreating this condition. It is desirable that the recent insights into APS pathogenesis, in particular the elucidation of the physiologic role of β2GPI and the identification of novel cellular pathogenic players, will soon allow opening new windows of opportunity in the management of pediatric APS.
Soybilgic, 2020, (96), USA-Slovénie	SAPL pédiatrique	Non	Non	NA	Non	Mise au point sur le SAPL pédiatrique
Wincup, 2018, (97), GB	Différence entre le SAPL chez lenfant et l'adulte	Non	Non	NA	Non	A number of key differences are seen when comparing the disease in childhood with the more well described adult onset form of the disease. Evidently the rates of PM

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						related symptoms are seldom seen in the childhood form of the disease. Children with APS are also at an increased risk of recurrent thrombotic events when compared with adults and so it is essential to maintain long-term anticoagulant therapy.

Tableau 3. Etudes cliniques

Auteur, année, référence, pays	Objectif	Méthodologie, niveau de preuve	Population	Intervention	Critères de jugement	Résultats et signification
Lockshin, 2000, (1), USA	Validation des critères de Sapporo	Etude prospective	243 patients	NA	Résultat classification	The Sapporo criteria for APS compare favorably with the American College of Rheumatology criteria for SLE and are usable for clinical studies.
Gendron, 2021, (6), France	Prévalence et valeur pronostique des aPL au cours du Covid	Etude prospective observationnelle	249 patients	NA	Présence d'aPL	Patients with COVID-19 have an increased prevalence of LAC positivity associated with biologic markers of inflammation. However, LAC positivity at the time of hospital admission is not associated with VTE risk and/or in-hospital mortality.
Jourdi, 2019, (9), France	Utilité du charbon activé pour doser les ACCL sous NACO	Etude prospective	151 patients	Recherche ACCL en DRVVT, HPLC-MS	Résultats d'ACCL	For dRVVT testing in DOAC patients, we suggest the use of DOAC remove® for every rivaroxaban sample, whereas it might only be used in positive apixaban and dabigatran samples. A residual DOAC interference cannot be ruled out in case of persisting dRVVT positive results after treatment with DOAC remove®.

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Maelegheer, 2018, (11), Belgique	Impact des cycles de gel-dégel sur les titres d'aPL	Etude prospective	42 patients	5 cycles de gel-dégel	Titres d'aPL	For all four aPL no statistical difference or degradation from positive to negative was seen, even after five FTC. The CCC between the first and fifth FTC were between 0.98 and 1 for all four aPL. aCL IgM/IgG and aβ2GPI IgM/IgG antibody titer, over a broad titer range, are stable over time and after repeated FTC.
Mazodier, 2012, (12), France	Hypoprothrombinémie-ACCL syndrome	Revue de cas	8 patients	NA	NA	LAHS associated with autoimmune diseases should be diagnosed and managed carefully because the disease is persistent and severe hemorrhagic complications are common.
Pengo, 2011, (13), Italie	Incidence d'un premier évènement thrombotique chez des porteurs d'aPL asymptomatiques	Etude prospective	104 patients	NA	Survenue d'un évènement thrombotique	The occurrence of a first TE in carriers of high-risk aPL profile is considerable; it is more frequent among male subjects and in the presence of additional risk factors for venous TE.
Arnaud, 2015, (20), International	Meta-analyse sur l'efficacité de l'AAS en prévention primaire des thromboses chez des patients aPL	Méta-analyse	497 patients	NA	Survenue d'un évènement thrombotique	This individual patient data meta-analysis shows that the risk of first thrombotic event as well of first arterial thrombotic event is significantly decreased among SLE patients and asymptomatic aPL

Auteur, année, référence, pays	Objectif	Méthodologie, niveau de preuve	Population	Intervention	Critères de jugement	Résultats et signification
						individuals treated by low-dose aspirin.
Arnaud, 2014, (21), International	Meta-analyse sur l'efficacité de l'AAS en prévention primaire des thromboses chez des patients aPL	Méta-analyse	1208 patients	NA	Survenue d'un évènement thrombotique	This meta-analysis shows that the risk of first thrombotic event is significantly decreased by low dose aspirin among asymptomatic aPL individuals, patients with SLE or obstetrical APS.
Bazzan, 2009, (23), Italie	Présence d'aPL au cours des cancers	Etude prospective	137 patients	Recherche d'aPL	Présence d'aPL et survenue de thomboses	A high prevalence of low-titre aPL was found in cancer patients at diagnosis, but no statistical difference in thrombosis-free survival or in overall survival was observed between aPL positive and aPL negative patients.
Chock, 2019, (26), USA-France	aPL et risque de thrombopénie au cours du LS	Méta-analyse + revue de la littérature	9019 patients	NA	Thrombopénie	The occurrence of thrombocytopenia was strongly determined by various aPL profiles in SLE patients. While the association between IgM antibodies and other APS manifestations including thrombosis is debated, IgM isotypes are helpful in the risk stratification of thrombocytopenia in SLE.
Cuadrado, 2014, (27), International	AAS à petite dose +/- AVK à petite dose en prévention	Etude prospective	166 patients	AAS à petite dose +/- AVK à petite dose	Survenue de thomboses	No differences in the number of thromboses were observed between patients treated with LDA

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	primaire des thromboses chez les patients aPL					vs those treated with LDA + W. More episodes of bleeding were detected in the LDA + W group. The LDA + W regime was significantly less safe and not as acceptable as LDA alone.
Devignes, 2019, (28), France	Persistance des aPL à 12 semaines	Etude rétrospective	17367 patients	NA	Taux d'aPL	Data from a large database of an aPL referral laboratory showed that the time interval of 12 weeks defining persistence of aPL positivity was appropriate for the majority of patients.
El Hasbani, 2021, (30), Liban	aPL au cours desmaladies auto-immunes et auto-inflammatoires, hors LS	Méta-analyse	3242 patients	NA	Présence d'aPL	Anti-phospholipid antibodies can be detected in up to a third of patients with inflammatory and autoimmune RMDs, especially in SSc.
Erkan, 2018, (31), International	HCQ en prevention primaire des thromboses chez les patients aPL sans MAI	Etude prospective	20 patients	HCQ ou PCB	Survenue de thromboses	Given that a small number of patients with a relatively short follow-up were enrolled in our RCT, and no patients developed thrombosis, we cannot accurately assess the effectiveness of HCQ for primary thrombosis prevention in persistently aPL-positive patients with no other systemic autoimmune diseases.

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Erkan, 2007, (32), USA	AAS en prevention primaire des thromboses chez les patients aPL	Etude prospective	98 patients	AAS ou PCB	Survenue de thomboses	Our results suggest that asymptomatic, persistently aPL-positive individuals do not benefit from low-dose aspirin for primary thrombosis prophylaxis, have a low overall annual incidence rate of acute thrombosis, and develop vascular events when additional thrombosis risk factors are present.
Gkrouzman, 2021, (34), International	Stabilité des aPL dans le temps	Etude de registre	472 patients	NA	Titres des aPL au cours du suivi	Approximately 80% of our international cohort patients with clinically meaningful aPL profiles at baseline remain stable at a median follow-up of 5 years; triple aPL-positivity increase the odds of a stable aPL profile.
Islam, 2020, (36), Malaisie	Prévalence des aPL au cours du Behçet	Méta-analyse + revue de la littérature	999 patients	NA	Présence d'aPL	This meta-analysis established that there is a significantly high prevalence of aPLs (i.e., aCL and anti-β2-GPI antibodies) in patients with BD when compared to controls.
Merashli, 2017, (39), Liban-Portugal	Prévalence des aPL au cours de la ScS	Méta-analyse + revue de la littérature	9 études de cas et 11 cohortes	NA	Présence d'aPL	A strong relationship exists between aCL and aβ2GPI of IgG/IgM isotype and SSc; patients positive for these antibodies are more likely to suffer from PAH, RD, thrombosis, and DI.

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Rees, 2006, (40), GB	Prévalence des aPL au cours des vascularites	Etude prospective	144 patients	NA	Présence d'aPL	The antiphospholipid syndrome, aCL, and the LA may occur in association with PSV.
Sobanski, 2018, (43), France	Prévalence des aPL au cours de la ScS	Méta-analyse + revue de la littérature + étude de registre	249 patients	NA	Présence d'aPL	This study found a prevalence of aPL positivity in our SSc population of 6.4% (3.8-10.4) and an overall worldwide pooled prevalence of 14% (9-20). In our SSc population, aPL positivity was associated with VT and miscarriage.
Urbanus, 2009, (46), Pays-Bas	aPL et risque d'IDM/AVC chez les femmes jeunes	Etude prospective	175 patientes AVC, 203 patientes IDM et 628 contrôles	NA	Caractéristiques cliniques et biologiques	Our results suggest that lupus anticoagulant is a major risk factor for arterial thrombotic events in young women, and the presence of other cardiovascular risk factors increases the risk even further.
Zuily, 2011, (47), France	aPL et pathologies valvulaires au cours du LS	Méta-analyse	1656 patients	NA	Atteinte valvulaire en échographie	Overall, the presence of aPL in SLE patients is significantly associated with an increased risk for HVD including Libman-Sacks endocarditis. The risk conferred by IgG anticardiolipin antibodies is as strong as by lupus anticoagulant.
Zuily, 2020, (48), International	Phénotypes cliniques des patients aPL	Analyse de clusters	497 patients	NA	Caractéristiques cliniques et biologiques	Based on our hierarchical cluster analysis, we identified different clinical phenotypes of aPL-positive patients discriminated by aPL profile, lupus or CVD risk factors.

Auteur, année, référence, pays	Objectif	Méthodologie, niveau de preuve	Population	Intervention	Critères de jugement	Résultats et signification
Zuily, 2017, (49), International	aPL et risque d'HTP au cours du LS	Méta-analyse + revue de la littérature	4480 patients	NA	HTP	Among SLE patients, aPL can identify patients at risk for PH and APAH.
Asherson, 1998, (51), Afrique du Sud	Description de patients avec un CAPS	Etude descriptive	50 patients	NA	Caractéristiques cliniques et biologiques	A review of 50 patients who manifest features of the catastrophic antiphospholipid syndrome (CAPS) is presented.
Asherson, 1998, (53), Inernational	Description de patients avec un CAPS	Etude descriptive	50 patients	NA	Caractéristiques cliniques et biologiques	We analyzed the clinical and laboratory characteristics of 50 patients with catastrophic antiphospholipid syndrome (APS) (5 from our clinics and 45 from a MEDLINE computer-assisted review of the literature from 1992 through 1996).
Bayraktar, 2007, (54), International	Comparaison des CAPS avec ou sans LS associé	Etude de registre	230 patients	NA	Caractéristiques cliniques et biologiques	SLE is a poor prognostic factor in patients with CAPS and cyclophosphamide may be beneficial in those with SLE-CAPS.
Berman, 2013, (55), Interantional	Rituximab au cours du CAPS	Etude de registre	20 patients	NA	Caractéristiques cliniques et biologiques	The purpose of this study is to describe the clinical manifestations, laboratory features, and outcomes of rituximab-treated CAPS patients. In addition, the rationale for using rituximab in catastrophic APS is discussed.

Auteur, année, référence, pays	Objectif	Méthodologie, niveau de preuve	Population	Intervention	Critères de jugement	Résultats et signification
Bucciarelli, 2006, (56), International	Mortalité au cours du CAPS	Etude de registre	250 patients	NA	Caractéristiques cliniques et biologiques	Cerebral involvement (mainly consisting of stroke), cardiac involvement, and infections were considered the main causes of death in patients with CAPS. The presence of SLE was related to a higher mortality rate. According to the results of the present study, ACs plus CS plus PE should be the first line of therapy in patients with CAPS.
Cervera, 2009, (58), International	Description du CAPS	Etude de registre	280 patients	NA	Caractéristiques cliniques et biologiques	The catastrophic APS is an uncommon but potentially life-threatening condition that needs high clinical awareness. The therapeutical connotation is that this may be corrected with the combination of anticoagulation plus steroids plus attempts at achieving a prompt reduction of antiphospholipid antibody titer (i.e. PE and/or IVIG).
Espinosa, 2013, (63), Espagne	Description du CAPS en rechute	Etude de registre	9/282 patients	NA	Caractéristiques cliniques et biologiques	Although relapses are rare in patients with catastrophic APS, these results support the hypothesis that an association between microangiopathic hemolytic anemia and relapsing of catastrophic APS could be present.

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Guillot, 2018, (64), France	Eculizumab au cours du CAPS	1 cas + revue de la littérature	1 patient	NA	Caractéristiques cliniques et biologiques	Our case supports the efficacy of eculizumab for refractory CAPS, although larger studies are necessary to confirm this observation.
Pineton de Chambrun, 2019, (68), France	Diagnostic de CAPS en reanimation	Etude de registre	134 patients	NA	Diagnostic de CAPS retenu	In this study, CAPS criteria were not associated with mortality of thrombotic APS patients requiring ICU admission. Further studies are need evaluate the adequacy of CAPS criteria for critically-ill APS patients.
Pineton de Chambrun, 2020, (69), France	Facteurs de mortalité de CAPS en reanimation	Etude de registre	134 patients	NA	Caractéristiques cliniques et biologiques	In-ICU anticoagulation was the only APS-specific treatment independently associated with survival for all patients. Double therapy was independently associated with better survival of patients with definite/probable catastrophic APS. In these patients, further studies are needed to determine the role of triple therapy.
Rodriguez-Pinto, 2018, (71), International	Triple thérapie au cours du CAPS	Etude de registre	502 patients	NA	Caractéristiques cliniques et biologiques	Triple therapy is independently associated with a higher survival rate among patients with CAPS.
Rodriguez-Pinto, 2016, (72), International	Description du CAPS	Etude de registre	500 patients	NA	Caractéristiques cliniques et biologiques	Although the presentation of CAPS is characterized by multiorgan thrombosis and failure, clinical

Auteur, année, référence, pays	Objectif	Méthodologie, niveau de preuve	Population	Intervention	Critères de jugement	Résultats et signification
						differences among patients exist based on age and underlying chronic diseases, e.g. malignancy and SLE.
Taraborelli, 2017, (75), International	Devenir au long cours des patients CAPS	Etude retrospective	115 patients	NA	Caractéristiques cliniques et biologiques	Despite therapy, a high proportion of patients experienced new thrombotic events and organ damage, while evolution toward CTD was infrequent.
Yelnik, 2020, (77), France	Eculizumab dans les CAPS réfractaires	Etude retrospective	11 patients	Eculizumab	Réponse au traitement	Patients with refractory CAPS respond inconsistently to eculizumab. However, eculizumab can successfully treat some critically ill patients and seems to be especially efficient in treating hematologic failure.
Abisror, 2013, (78), France	Maladies du spectre autistiques chez les enfants de mère SAPL	Etude retrospective	48 patients	NA	Maladies du spectre autistiques	Autism spectrum disorders could be observed in babies born to mothers with antiphospholipid syndrome, but there is no risk of thrombosis.
Alijotas-Reig, 2019, (79), International	SAPL obstetrical	Etude de registre	1000 patientes	NA	Caractéristiques cliniques et biologiques, devenir obstétrical	In this series, recurrent miscarriage is the most frequent poor outcome. To avoid false-negative diagnoses, all laboratory category subsets were needed. OAPS cases have very good foetal-maternal outcomes when treated. Results suggest that we were able to

Auteur, année, référence, pays	Objectif	Méthodologie, niveau de preuve	Population	Intervention	Critères de jugement	Résultats et signification
						improve our clinical practice to offer better treatment and outcomes to OAPS patients.
Avcin, 2008, (80), International	SAPL pédiatrique	Etude de registre	121 patients	NA	Caractéristiques cliniques et biologiques	Clinical and laboratory characterization of patients with pediatric antiphospholipid syndrome implies some important differences between antiphospholipid syndrome in pediatric and adult populations. Comparisons between children with primary antiphospholipid syndrome and antiphospholipid syndrome associated with autoimmune disease have revealed certain differences that suggest 2 distinct subgroups.
Bouvier, 2014, (82), France	SAPL obstetrical	Etude rétrospective	513 patientes	NA	Caractéristiques cliniques et biologiques, devenir obstétrical	Improved therapies, in particular better prophylaxis of late pregnancy complications, are urgently needed for obstetric APS and should be evaluated according to the type of pregnancy loss.
Gris, 2011, (84), France	Enoxaparine + AAS en prevention secondaire après une pré-éclampsie sévère	Etude prospective	224 patientes	Enoxaparine + AAS	Devenir obstétrical	This pilot study shows that enoxaparin given early during the second pregnancy decreases the occurrence of placental vascular complications in women with a

Auteur, année, référence, pays	Objectif	Méthodologie, niveau de preuve	Population	Intervention	Critères de jugement	Résultats et signification
						previous severe pre-eclampsia during their first pregnancy.
Lageix, 2015, (86), France	Maladies du spectre autistiques chez les enfants aPL+	Etude prospective	44 patients	NA	Maladies du spectre autistiques	ASD had no significant relation with the presence of APL antibodies.
Mekinian, 2013, 89), International	Registre des enfants nés de mère SAPL	Etude de registre	134 patients	NA	Caractéristiques cliniques et biologiques	Despite the presence of APL in children, thrombosis or SLE were not observed. The presence of neurodevelopmental abnormalities seems to be more important in these children, and could justify long-term follow-up.
Sloan, 2021, (95), USA	FDR de thromboses chez les enfants aPL+	Etude rétrospective	491 patientes	NA	Survenue de thrombose	Data from our cohort suggest that Raynaud's phenomenon is a potential predictor of arterial thrombosis while the presence of hypertension or anti-hypertensive medication use is a potential predictor of venous thrombosis in aPL positive pediatric carriers.

Bibliographie

Généralités

1. Lockshin, M.D., Sammaritano, L.R., Schwartzman, S., 2000. Validation of the Sapporo criteria for anti-phospholipid syndrome. Arthritis Rheum 43, 440–443. https://doi.org/10.1002/1529-0131(200002)43:2<440::AID-ANR26>3.0.CO;2-N
2. Miyakis, S., Lockshin, M.D., Atsumi, T., Branch, D.W., Brey, R.L., Cervera, R., Derksen, R.H.W.M., DE Groot, P.G., Koike, T., Meroni, P.L., Reber, G., Shoenfeld, Y., Tincani, A., Vlachoyiannopoulos, P.G., Krilis, S.A., 2006. International consensus statement on an update of the classification criteria for definite anti-phospholipid syndrome (APS). J Thromb Haemost 4, 295–306. https://doi.org/10.1111/j.1538-7836.2006.01753.x

Diagnostic et évaluation initiale

3. Bernardoff, Inès, Alexandre Picq, Pierre Loiseau, Thomas Foret, Virginie Dufrost, Thomas Moulinet, Ozan Unlu, Doruk Erkan, Denis Wahl, et Stéphane Zuily. « Antiphospholipid Antibodies and the Risk of Autoimmune Hemolytic Anemia in Patients with Systemic Lupus Erythematosus: A Systematic Review and Meta-Analysis ». *Autoimmunity Reviews* 21, nº 1 (janvier 2022): 102913. https://doi.org/10.1016/j.autrev.2021.102913.
4. Devreese, Katrien M. J., Philip G. de Groot, Bas de Laat, Doruk Erkan, Emmanuel J. Favaloro, Ian Mackie, Marta Martinuzzo, et al. « Guidance from the Scientific and Standardization Committee for Lupus Anticoagulant/Antiphospholipid Antibodies of the International Society on Thrombosis and Haemostasis: Update of the Guidelines for Lupus Anticoagulant Detection and Interpretation ». *Journal of Thrombosis and Haemostasis: JTH* 18, nº 11 (novembre 2020): 2828-39. https://doi.org/10.1111/jth.15047.
5. Fonseca, Ana Catarina, Áine Merwick, Martin Dennis, Julia Ferrari, José M. Ferro, Peter Kelly, Avtar Lal, Angel Ois, Jean Marc Olivot, et Francisco Purroy. « European Stroke Organisation (ESO) Guidelines on Management of Transient Ischaemic Attack ». *European Stroke Journal* 6, nº 2 (juin 2021): CLXIII-CLXXXVI. https://doi.org/10.1177/2396987321992905.
6. Gendron, Nicolas, Marie-Agnès Dragon-Durey, Richard Chocron, Luc Darnige, Georges Jourdi, Aurélien Philippe, Camille Chenevier-Gobeaux, et al. « Lupus Anticoagulant Single Positivity During the Acute Phase of COVID-19 Is Not Associated With Venous Thromboembolism or In-Hospital Mortality ». *Arthritis & Rheumatology (Hoboken, N.J.)* 73, nº 11 (novembre 2021): 1976-85. https://doi.org/10.1002/art.41777.
7. Heidbuchel, Hein, Peter Verhamme, Marco Alings, Matthias Antz, Hans-Christoph Diener, Werner Hacke, Jonas Oldgren, et al. « Updated European Heart Rhythm Association Practical Guide on the Use of Non-Vitamin-K Antagonist Anticoagulants in Patients with Non-Valvular Atrial Fibrillation: Executive Summary ». *European Heart Journal* 38, nº 27 (14 juillet 2017): 2137-49. https://doi.org/10.1093/eurheartj/ehw058.
8. Joste, V., M.-A. Dragon-Durey, et L. Darnige. « [Laboratory diagnosis of antiphospholipid syndrome: From criteria to practice] ». *La Revue De Medecine Interne* 39, nº 1 (janvier 2018): 34-41. https://doi.org/10.1016/j.revmed.2017.02.006.

9. Jourdi, Georges, Maxime Delrue, Alain Stepanian, Jessica Valaize, Geoffrey Foulon-Pinto, Julien Demagny, Jerome Duchemin, et al. « Potential Usefulness of Activated Charcoal (DOAC Remove®) for DRVVT Testing in Patients Receiving Direct Oral AntiCoagulants ». *Thrombosis Research* 184 (décembre 2019): 86-91. https://doi.org/10.1016/j.thromres.2019.11.001.
10. Klijn, Catharina Jm, Maurizio Paciaroni, Eivind Berge, Eleni Korompoki, Janika Kõrv, Avtar Lal, Jukka Putaala, et David J. Werring. « Antithrombotic Treatment for Secondary Prevention of Stroke and Other Thromboembolic Events in Patients with Stroke or Transient Ischemic Attack and Non-Valvular Atrial Fibrillation: A European Stroke Organisation Guideline ». *European Stroke Journal* 4, nº 3 (septembre 2019): 198-223. https://doi.org/10.1177/2396987319841187.
11. Maelegheer, Karel, et Katrien M. J. Devreese. « The Impact of Repeated Freeze-Thaw Cycles on Antiphospholipid Antibody Titer ». *Research and Practice in Thrombosis and Haemostasis* 2, nº 2 (avril 2018): 366-69. https://doi.org/10.1002/rth2.12071.
12. Mazodier, Karin, Laurent Arnaud, Alexis Mathian, Nathalie Costedoat-Chalumeau, Julien Haroche, Camille Frances, Jean-Robert Harlé, et al. « Lupus Anticoagulant-Hypoprothrombinemia Syndrome: Report of 8 Cases and Review of the Literature ». *Medicine* 91, nº 5 (septembre 2012): 251-60. https://doi.org/10.1097/MD.0b013e31826b971f.
13. Pengo, Vittorio, Amelia Ruffatti, Cristina Legnani, Sophie Testa, Tiziana Fierro, Francesco Marongiu, Valeria De Micheli, et al. « Incidence of a First Thromboembolic Event in Asymptomatic Carriers of High-Risk Antiphospholipid Antibody Profile: A Multicenter Prospective Study ». *Blood* 118, nº 17 (27 octobre 2011): 4714-18. https://doi.org/10.1182/blood-2011-03-340232.
14. Powers, William J., Alejandro A. Rabinstein, Teri Ackerson, Opeolu M. Adeoye, Nicholas C. Bambakidis, Kyra Becker, José Biller, et al. « Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association ». *Stroke* 50, nº 12 (décembre 2019): e344-418. https://doi.org/10.1161/STR.0000000000000211.
15. Ruiz-Irastorza, Guillermo, Mark Crowther, Ware Branch, et Munther A. Khamashta. « Antiphospholipid Syndrome ». *Lancet (London, England)* 376, nº 9751 (30 octobre 2010): 1498-1509. https://doi.org/10.1016/S0140-6736(10)60709-X.
16. Steffel, Jan, Peter Verhamme, Tatjana S. Potpara, Pierre Albaladejo, Matthias Antz, Lien Desteghe, Karl Georg Haeusler, et al. « The 2018 European Heart Rhythm Association Practical Guide on the Use of Non-Vitamin K Antagonist Oral Anticoagulants in Patients with Atrial Fibrillation ». *European Heart Journal* 39, nº 16 (21 avril 2018): 1330-93. https://doi.org/10.1093/eurheartj/ehy136.
17. Tektonidou, Maria G., Laura Andreoli, Marteen Limper, Zahir Amoura, Ricard Cervera, Nathalie Costedoat-Chalumeau, Maria Jose Cuadrado, et al. « EULAR Recommendations for the Management of Antiphospholipid Syndrome in Adults ». *Annals of the Rheumatic Diseases* 78, nº 10 (octobre 2019): 1296-1304. https://doi.org/10.1136/annrheumdis-2019-215213.
18. Tripodi, A., B. de Laat, D. Wahl, W. Ageno, B. Cosmi, M. Crowther, et Subcommittees on Control of Anticoagulation and Lupus Anticoagulant/Antiphospholipid Antibodies. « Monitoring Patients with the Lupus Anticoagulant While Treated with Vitamin K Antagonists: Communication from the SSC of the ISTH ». *Journal of Thrombosis and*

Haemostasis: JTH 14, n° 11 (novembre 2016): 2304-7. https://doi.org/10.1111/jth.13481.

Prise en charge

19. Abdel-Wahab, N., Talathi, S., Lopez-Olivo, M.A., Suarez-Almazor, M.E., 2018. Risk of developing anti-phospholipid antibodies following viral infection: a systematic review and meta-analysis. Lupus 27, 572–583. https://doi.org/10.1177/0961203317731532
20. Arnaud, L., Mathian, A., Devilliers, H., Ruffatti, A., Tektonidou, M., Forastiero, R., Pengo, V., Lambert, M., Lefevre, G., Martinez-Zamora, M.A., Balasch, J., Wahl, D., Amoura, Z., 2015. Patient-level analysis of five international cohorts further confirms the efficacy of aspirin for the primary prevention of thrombosis in patients with anti-phospholipid antibodies. Autoimmun Rev 14, 192–200. https://doi.org/10.1016/j.autrev.2014.10.019
21. Arnaud, L., Mathian, A., Ruffatti, A., Erkan, D., Tektonidou, M., Cervera, R., Forastiero, R., Pengo, V., Lambert, M., Martinez-Zamora, M.A., Balasch, J., Zuily, S., Wahl, D., Amoura, Z., 2014. Efficacy of aspirin for the primary prevention of thrombosis in patients with anti-phospholipid antibodies: an international and collaborative meta-analysis. Autoimmun Rev 13, 281–291. https://doi.org/10.1016/j.autrev.2013.10.014
22. Barbhaiya, M., Zuily, S., Ahmadzadeh, Y., Amigo, M.-C., Avcin, T., Bertolaccini, M.L., Branch, D.W., de Jesus, G., Devreese, K.M.J., Frances, C., Garcia, D., Guillemin, F., Levine, S.R., Levy, R.A., Lockshin, M.D., Ortel, T.L., Seshan, S.V., Tektonidou, M., Wahl, D., Willis, R., Naden, R., Costenbader, K., Erkan, D., New APS Classification Criteria Collaborators, 2021. Development of a New International Anti-phospholipid Syndrome Classification Criteria Phase I/II Report: Generation and Reduction of Candidate Criteria. Arthritis Care Res (Hoboken) 73, 1490–1501. https://doi.org/10.1002/acr.24520
23. Bazzan, M., Montaruli, B., Vaccarino, A., Fornari, G., Saitta, M., Prandoni, P., 2009. Presence of low titre of anti-phospholipid antibodies in cancer patients: a prospective study. Intern Emerg Med 4, 491–495. https://doi.org/10.1007/s11739-009-0316-6
24. Belizna, C., Pregnolato, F., Abad, S., Alijotas-Reig, J., Amital, H., Amoura, Z., Andreoli, L., Andres, E., Aouba, A., Apras Bilgen, S., Arnaud, L., Bienvenu, B., Bitsadze, V., Blanco, P., Blank, M., Borghi, M.O., Caligaro, A., Candrea, E., Canti, V., Chiche, L., Chretien, J.M., Cohen Tervaert, J.W., Damian, L., Delross, T., Dernis, E., Devreese, K., Djokovic, A., Esteve-Valverde, E., Favaro, M., Fassot, C., Ferrer-Oliveras, R., Godon, A., Hamidou, M., Hasan, M., Henrion, D., Imbert, B., Jeandel, P.Y., Jeannin, P., Jego, P., Jourde-Chiche, N., Khizroeva, J., Lambotte, O., Landron, C., Latino, J.O., Lazaro, E., de Leeuw, K., Le Gallou, T., Kiliç, L., Limper, M., Loufrani, L., Lubin, R., Magy-Bertrand, N., Mahe, G., Makatsariya, A., Martin, T., Muchardt, C., Nagy, G., Omarjee, L., Van Paasen, P., Pernod, G., Perrinet, F., Pïres Rosa, G., Pistorius, M.A., Ruffatti, A., Said, F., Saulnier, P., Sene, D., Sentilhes, L., Shovman, O., Sibilia, J., Sinescu, C., Stanisavljevic, N., Stojanovich, L., Tam, L.S., Tincani, A., Tollis, F., Udry, S., Ungeheuer, M.N., Versini, M., Cervera, R., Meroni, P.L., 2018. HIBISCUS: Hydroxychloroquine for the secondary prevention of thrombotic and obstetrical events in primary anti-phospholipid syndrome. Autoimmun Rev 17, 1153–1168. https://doi.org/10.1016/j.autrev.2018.05.012

25. Bizzaro, N., Pasini, P., Finco, B., 1999. False-positive reactions for IgA anti-phospholipid and anti-beta(2)-glycoprotein I antibodies in patients with IgA monoclonal gammopathy. Clin Chem 45, 2007–2010.
26. Chock, Y.P., Moulinet, T., Dufrost, V., Erkan, D., Wahl, D., Zuily, S., 2019. Anti-phospholipid antibodies and the risk of thrombocytopenia in patients with systemic lupus erythematosus: A systematic review and meta-analysis. Autoimmun Rev 18, 102395. https://doi.org/10.1016/j.autrev.2019.102395
27. Cuadrado, M.J., Bertolaccini, M.L., Seed, P.T., Tektonidou, M.G., Aguirre, A., Mico, L., Gordon, C., Ruiz-Irastorza, G., Egurbide, M.V., Gil, A., Espinosa, G., Houssiau, F., Rahman, A., Martin, H., McHugh, N., Galindo, M., Akil, M., Amigo, M.C., Murru, V., Khamashta, M.A., 2014. Low-dose aspirin vs low-dose aspirin plus low-intensity warfarin in thromboprophylaxis: a prospective, multicentre, randomized, open, controlled trial in patients positive for anti-phospholipid antibodies (ALIWAPAS). Rheumatology (Oxford) 53, 275–284. https://doi.org/10.1093/rheumatology/ket313
28. Devignes, J., Smaïl-Tabbone, M., Hervé, A., Cagninacci, G., Devignes, M.-D., Lecompte, T., Zuily, S., Wahl, D., 2019. Extended persistence of anti-phospholipid antibodies beyond the 12-week time interval: Association with baseline anti-phospholipid antibodies titres. Int J Lab Hematol 41, 726–730. https://doi.org/10.1111/ijlh.13094
29. Devreese, K.M.J., de Groot, P.G., de Laat, B., Erkan, D., Favaloro, E.J., Mackie, I., Martinuzzo, M., Ortel, T.L., Pengo, V., Rand, J.H., Tripodi, A., Wahl, D., Cohen, H., 2020. Guidance from the Scientific and Standardization Committee for lupus anticoagulant/anti-phospholipid antibodies of the International Society on Thrombosis and Haemostasis: Update of the guidelines for lupus anticoagulant detection and interpretation. J Thromb Haemost 18, 2828–2839. https://doi.org/10.1111/jth.15047
30. El Hasbani, G., Viola, M., Sciascia, S., Taher, A.T., Uthman, I., 2021. Anti-phospholipid Antibodies in Inflammatory and Autoimmune Rheumatic and Musculoskeletal Diseases Beyond Lupus: A Systematic Review of the Available Evidence. Rheumatol Ther 8, 81–94. https://doi.org/10.1007/s40744-020-00273-w
31. Erkan, D., Harrison, M.J., Levy, R., Peterson, M., Petri, M., Sammaritano, L., Unalp-Arida, A., Vilela, V., Yazici, Y., Lockshin, M.D., 2007. Aspirin for primary thrombosis prevention in the anti-phospholipid syndrome: a randomized, double-blind, placebo-controlled trial in asymptomatic anti-phospholipid antibody-positive individuals. Arthritis Rheum 56, 2382–2391. https://doi.org/10.1002/art.22663
32. Erkan, D., Unlu, O., Sciascia, S., Belmont, H.M., Branch, D.W., Cuadrado, M.J., Gonzalez, E., Knight, J.S., Uthman, I., Willis, R., Zhang, Z., Wahl, D., Zuily, S., Tektonidou, M.G., APS ACTION, 2018. Hydroxychloroquine in the primary thrombosis prophylaxis of anti-phospholipid antibody positive patients without systemic autoimmune disease. Lupus 27, 399–406. https://doi.org/10.1177/0961203317724219
33. Foret, T., Dufrost, V., Salomon Du Mont, L., Costa, P., Lefevre, B., Lacolley, P., Regnault, V., Zuily, S., Wahl, D., 2021. Systematic Review of Anti-phospholipid Antibodies in COVID-19 Patients: Culprits or Bystanders? Curr Rheumatol Rep 23, 65. https://doi.org/10.1007/s11926-021-01029-3
34. Gkrouzman, E., Sevim, E., Finik, J., Andrade, D., Pengo, V., Sciascia, S., Tektonidou, M.G., Ugarte, A., Chighizola, C.B., Belmont, H.M., Lopez-Pedrera, C., Ji, L., Fortin, P., Efthymiou, M., de Jesus, G.R., Branch, D.W., Nalli, C., Petri, M., Rodriguez, E., Cervera, R., Knight, J.S., Atsumi, T., Willis, R., Bertolaccini, M.L., Cohen, H., Rand, J., Erkan, D., APS ACTION+, 2021. Anti-phospholipid Antibody Profile Stability Over Time:

Prospective Results From the APS ACTION Clinical Database and Repository. J Rheumatol 48, 541–547. https://doi.org/10.3899/jrheum.200513

35. Hindricks, G., Potpara, T., Dagres, N., Arbelo, E., Bax, J.J., Blomström-Lundqvist, C., Boriani, G., Castella, M., Dan, G.-A., Dilaveris, P.E., Fauchier, L., Filippatos, G., Kalman, J.M., La Meir, M., Lane, D.A., Lebeau, J.-P., Lettino, M., Lip, G.Y.H., Pinto, F.J., Thomas, G.N., Valgimigli, M., Van Gelder, I.C., Van Putte, B.P., Watkins, C.L., ESC Scientific Document Group, 2021. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS): The Task Force for the diagnosis and management of atrial fibrillation of the European Society of Cardiology (ESC) Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. Eur Heart J 42, 373–498. https://doi.org/10.1093/eurheartj/ehaa612
36. Islam, M.A., Alam, S.S., Kundu, S., Prodhan, A.H.M.S.U., Khandker, S.S., Reshetnyak, T., Kotyla, P.J., Hassan, R., Hossan, T., 2020. Prevalence of anti-phospholipid antibodies in Behçet's disease: A systematic review and meta-analysis. PLoS One 15, e0227836. https://doi.org/10.1371/journal.pone.0227836
37. Lakos, G., Teodorescu, M., 2011. IgM, but not IgA rheumatoid factor interferes with anti-cardiolipin and antiβ2 glycoprotein I measurements: a quantitative analysis. Lupus 20, 614–619. https://doi.org/10.1177/0961203310393379
38. Mekinian, A., Vicaut, E., Cohen, J., Bornes, M., Kayem, G., Fain, O., 2018. [Hydroxychloroquine to obtain pregnancy without adverse obstetrical events in primary anti-phospholipid syndrome: French phase II multicenter randomized trial, HYDROSAPL]. Gynecol Obstet Fertil Senol 46, 598–604. https://doi.org/10.1016/j.gofs.2018.06.008
39. Merashli, M., Alves, J., Ames, P.R.J., 2017. Clinical relevance of anti-phospholipid antibodies in systemic sclerosis: A systematic review and meta-analysis. Semin Arthritis Rheum 46, 615–624. https://doi.org/10.1016/j.semarthrit.2016.10.004
40. Rees, J.D., Lança, S., Marques, P.V., Gómez-Puerta, J.A., Moco, R., Oliveri, C., Khamashta, M.A., Hughes, G.R.V., D'Cruz, D.P., 2006. Prevalence of the anti-phospholipid syndrome in primary systemic vasculitis. Ann Rheum Dis 65, 109–111. https://doi.org/10.1136/ard.2004.034231
41. Sammaritano, L.R., 2021. Which Hormones and Contraception for Women with APS? Exogenous Hormone Use in Women with APS. Curr Rheumatol Rep 23, 44. https://doi.org/10.1007/s11926-021-01006-w
42. Schreiber, K., Breen, K., Cohen, H., Jacobsen, S., Middeldorp, S., Pavord, S., Regan, L., Roccatello, D., Robinson, S.E., Sciascia, S., Seed, P.T., Watkins, L., Hunt, B.J., 2017. HYdroxychloroquine to Improve Pregnancy Outcome in Women with Anti-phospholipid Antibodies (HYPATIA) Protocol: A Multinational Randomized Controlled Trial of Hydroxychloroquine versus Placebo in Addition to Standard Treatment in Pregnant Women with Anti-phospholipid Syndrome or Antibodies. Semin Thromb Hemost 43, 562–571. https://doi.org/10.1055/s-0037-1603359
43. Sobanski, V., Lemaire-Olivier, A., Giovannelli, J., Dauchet, L., Simon, M., Lopez, B., Yelnik, C., Lambert, M., Hatron, P.-Y., Hachulla, E., Dubucquoi, S., Launay, D., 2018. Prevalence and Clinical Associations of Anti-phospholipid Antibodies in Systemic Sclerosis: New Data From a French Cross-Sectional Study, Systematic Review, and Meta-Analysis. Front Immunol 9, 2457. https://doi.org/10.3389/fimmu.2018.02457

44. Tektonidou, M.G., Andreoli, L., Limper, M., Amoura, Z., Cervera, R., Costedoat-Chalumeau, N., Cuadrado, M.J., Dörner, T., Ferrer-Oliveras, R., Hambly, K., Khamashta, M.A., King, J., Marchiori, F., Meroni, P.L., Mosca, M., Pengo, V., Raio, L., Ruiz-Irastorza, G., Shoenfeld, Y., Stojanovich, L., Svenungsson, E., Wahl, D., Tincani, A., Ward, M.M., 2019. EULAR recommendations for the management of anti-phospholipid syndrome in adults. Ann Rheum Dis 78, 1296–1304. https://doi.org/10.1136/annrheumdis-2019-215213
45. Ünlü, O., Zuily, S., Erkan, D., 2016. The clinical significance of anti-phospholipid antibodies in systemic lupus erythematosus. Eur J Rheumatol 3, 75–84. https://doi.org/10.5152/eurjrheum.2015.0085
46. Urbanus, R.T., Siegerink, B., Roest, M., Rosendaal, F.R., de Groot, P.G., Algra, A., 2009. Anti-phospholipid antibodies and risk of myocardial infarction and ischaemic stroke in young women in the RATIO study: a case-control study. Lancet Neurol 8, 998–1005. https://doi.org/10.1016/S1474-4422(09)70239-X
47. Zuily, S., Clerc-Urmès, I., Bauman, C., Andrade, D., Sciascia, S., Pengo, V., Tektonidou, M.G., Ugarte, A., Gerosa, M., Michael Belmont, H., Zamorano, M.A.A., Fortin, P., Ji, L., Efthymiou, M., Cohen, H., Branch, D.W., Jesus, G.R. de, Nalli, C., Petri, M., Rodriguez, E., Cervera, R., Knight, J.S., Atsumi, T., Willis, R., Bertolaccini, M.L., Vega, J., Wahl, D., Erkan, D., APS ACTION Investigators, 2020. Cluster analysis for the identification of clinical phenotypes among anti-phospholipid antibody-positive patients from the APS ACTION Registry. Lupus 961203320940776. https://doi.org/10.1177/0961203320940776
48. Zuily, S., Domingues, V., Suty-Selton, C., Eschwège, V., Bertoletti, L., Chaouat, A., Chabot, F., Regnault, V., Horn, E.M., Erkan, D., Wahl, D., 2017. Anti-phospholipid antibodies can identify lupus patients at risk of pulmonary hypertension: A systematic review and meta-analysis. Autoimmun Rev 16, 576–586. https://doi.org/10.1016/j.autrev.2017.04.003
49. Zuily, S., Regnault, V., Selton-Suty, C., Eschwège, V., Bruntz, J.-F., Bode-Dotto, E., De Maistre, E., Dotto, P., Perret-Guillaume, C., Lecompte, T., Wahl, D., 2011. Increased risk for heart valve disease associated with anti-phospholipid antibodies in patients with systemic lupus erythematosus: meta-analysis of echocardiographic studies. Circulation 124, 215–224. https://doi.org/10.1161/CIRCULATIONAHA.111.028522

CAPS

50. Asherson, R.A., 1998. The catastrophic anti-phospholipid syndrome, 1998. A review of the clinical features, possible pathogenesis and treatment. Lupus 7 Suppl 2, S55-62. https://doi.org/10.1177/096120339800700214
51. Asherson, R.A., 1992. The catastrophic anti-phospholipid syndrome. J Rheumatol 19, 508–512.
52. Asherson, R.A., Cervera, R., de Groot, P.G., Erkan, D., Boffa, M.C., Piette, J.C., Khamashta, M.A., Shoenfeld, Y., Catastrophic Anti-phospholipid Syndrome Registry Project Group, 2003. Catastrophic anti-phospholipid syndrome: international consensus statement on classification criteria and treatment guidelines. Lupus 12, 530–534. https://doi.org/10.1191/0961203303lu394oa
53. Asherson, R.A., Cervera, R., Piette, J.C., Font, J., Lie, J.T., Burcoglu, A., Lim, K., Muñoz-Rodríguez, F.J., Levy, R.A., Boué, F., Rossert, J., Ingelmo, M., 1998. Catastrophic anti-phospholipid syndrome. Clinical and laboratory features of 50 patients. Medicine (Baltimore) 77, 195–207. https://doi.org/10.1097/00005792-199805000-00005

54. Bayraktar, U.D., Erkan, D., Bucciarelli, S., Espinosa, G., Asherson, R., Catastrophic Anti-phospholipid Syndrome Project Group, 2007. The clinical spectrum of catastrophic anti-phospholipid syndrome in the absence and presence of lupus. J Rheumatol 34, 346–352.
55. Berman, H., Rodríguez-Pintó, I., Cervera, R., Morel, N., Costedoat-Chalumeau, N., Erkan, D., Shoenfeld, Y., Espinosa, G., Catastrophic Anti-phospholipid Syndrome (CAPS) Registry Project Group (European Forum on Anti-phospholipid Antibodies), 2013. Rituximab use in the catastrophic anti-phospholipid syndrome: descriptive analysis of the CAPS registry patients receiving rituximab. Autoimmun Rev 12, 1085–1090. https://doi.org/10.1016/j.autrev.2013.05.004
56. Bucciarelli, S., Espinosa, G., Cervera, R., Erkan, D., Gómez-Puerta, J.A., Ramos-Casals, M., Font, J., Asherson, R.A., European Forum on Anti-phospholipid Antibodies, 2006. Mortality in the catastrophic anti-phospholipid syndrome: causes of death and prognostic factors in a series of 250 patients. Arthritis Rheum 54, 2568–2576. https://doi.org/10.1002/art.22018
57. Cervera, R., Bucciarelli, S., Plasín, M.A., Gómez-Puerta, J.A., Plaza, J., Pons-Estel, G., Shoenfeld, Y., Ingelmo, M., Espinos, G., Catastrophic Anti-phospholipid Syndrome (CAPS) Registry Project Group (European Forum On Anti-phospholipid Antibodies), 2009. Catastrophic anti-phospholipid syndrome (CAPS): descriptive analysis of a series of 280 patients from the "CAPS Registry." J Autoimmun 32, 240–245. https://doi.org/10.1016/j.jaut.2009.02.008
58. Cervera, R., Rodríguez-Pintó, I., Colafrancesco, S., Conti, F., Valesini, G., Rosário, C., Agmon-Levin, N., Shoenfeld, Y., Ferrão, C., Faria, R., Vasconcelos, C., Signorelli, F., Espinosa, G., 2014. 14th International Congress on Anti-phospholipid Antibodies Task Force Report on Catastrophic Anti-phospholipid Syndrome. Autoimmun Rev 13, 699–707. https://doi.org/10.1016/j.autrev.2014.03.002
59. Cervera, R., Tektonidou, M.G., Espinosa, G., Cabral, A.R., González, E.B., Erkan, D., Vadya, S., Adrogué, H.E., Solomon, M., Zandman-Goddard, G., Shoenfeld, Y., 2011. Task Force on Catastrophic Anti-phospholipid Syndrome (APS) and Non-criteria APS Manifestations (I): catastrophic APS, APS nephropathy and heart valve lesions. Lupus 20, 165–173. https://doi.org/10.1177/0961203310395051
60. Cranley, J., Krishnan, U., Tweed, K., Duehmke, R.M., 2019. Catastrophic anti-phospholipid syndrome causing ST-segment elevation myocardial infarction with non-obstructive coronary arteries. BMJ Case Rep 12, bcr-2018-225495. https://doi.org/10.1136/bcr-2018-225495
61. Drimbea, A., Cretu, I., Jany, B., Milazzo, S., 2015. Severe vaso-occlusive chorioretinopathy in a patient with catastrophic anti-phospholipid antibody syndrome secondary to systemic lupus erythematosus. J Fr Ophtalmol 38, e61-66. https://doi.org/10.1016/j.jfo.2014.05.024
62. Erkan, D., Espinosa, G., Cervera, R., 2010. Catastrophic anti-phospholipid syndrome: updated diagnostic algorithms. Autoimmun Rev 10, 74–79. https://doi.org/10.1016/j.autrev.2010.08.005
63. Espinosa, G., Rodríguez-Pintó, I., Gomez-Puerta, J.A., Pons-Estel, G., Cervera, R., Catastrophic Anti-phospholipid Syndrome (CAPS) Registry Project Group (European Forum on Anti-phospholipid Antibodies), 2013. Relapsing catastrophic anti-phospholipid syndrome potential role of microangiopathic hemolytic anemia in disease

relapses. Semin Arthritis Rheum 42, 417–423. https://doi.org/10.1016/j.semarthrit.2012.05.005

64. Guillot, M., Rafat, C., Buob, D., Coppo, P., Jamme, M., Rondeau, E., Fain, O., Mekinian, A., 2018. Eculizumab for catastrophic anti-phospholipid syndrome-a case report and literature review. Rheumatology (Oxford) 57, 2055–2057. https://doi.org/10.1093/rheumatology/key228
65. Hucker, W.J., Chatzizisis, Y.S., Steigner, M.L., Winters, G.L., Kirshenbaum, J.M., 2014. Myocardial catastrophe: a case of sudden, severe myocardial dysfunction. Circulation 130, 854–862. https://doi.org/10.1161/CIRCULATIONAHA.113.007417
66. Jabrane, M., Ez-Zahraoui, M.R., Hajji, I., Fadili, W., Moutaouakil, A., Laouad, I., 2017. Central retinal vein occlusion in a patient on hemodialysis secondary to anti-phospholipid syndrome: Case report. Nephrol Ther 13, 245–247. https://doi.org/10.1016/j.nephro.2016.07.455
67. Joshi, U., Afroz, S., Ranka, S., Mba, B., 2018. Bilateral central retinal artery occlusion from catastrophic anti-phospholipid syndrome. BMJ Case Rep 2018, bcr-2018-226463. https://doi.org/10.1136/bcr-2018-226463
68. Pineton de Chambrun, M., Larcher, R., Pène, F., Argaud, L., Demoule, A., Jamme, M., Coudroy, R., Mathian, A., Gibelin, A., Azoulay, E., Tandjaoui-Lambiotte, Y., Dargent, A., Beloncle, F.-M., Raphalen, J.-H., Couteau-Chardon, A., de Prost, N., Devaquet, J., Contou, D., Gaugain, S., Trouiller, P., Grangé, S., Ledochowski, S., Lemarie, J., Faguer, S., Degos, V., Combes, A., Luyt, C.-E., Amoura, Z., SAPHIR study group, 2019. CAPS criteria fail to identify most severely-ill thrombotic anti-phospholipid syndrome patients requiring intensive care unit admission. J Autoimmun 103, 102292. https://doi.org/10.1016/j.jaut.2019.06.003
69. Pineton de Chambrun, M., Larcher, R., Pène, F., Argaud, L., Mayaux, J., Jamme, M., Coudroy, R., Mathian, A., Gibelin, A., Azoulay, E., Tandjaoui-Lambiotte, Y., Dargent, A., Beloncle, F.-M., Raphalen, J.-H., Couteau-Chardon, A., de Prost, N., Devaquet, J., Contou, D., Gaugain, S., Trouiller, P., Grangé, S., Ledochowski, S., Lemarie, J., Faguer, S., Degos, V., Luyt, C.-E., Combes, A., Amoura, Z., 2020. In-Hospital Mortality-Associated Factors in Patients With Thrombotic Anti-phospholipid Syndrome Requiring ICU Admission. Chest 157, 1158–1166. https://doi.org/10.1016/j.chest.2019.11.010
70. Rodríguez-Pintó, I., Cervera, R., Espinosa, G., 2015. Rituximab and its therapeutic potential in catastrophic anti-phospholipid syndrome. Ther Adv Musculoskelet Dis 7, 26–30. https://doi.org/10.1177/1759720X14554793
71. Rodríguez-Pintó, I., Espinosa, G., Erkan, D., Shoenfeld, Y., Cervera, R., CAPS Registry Project Group, 2018. The effect of triple therapy on the mortality of catastrophic anti-phospholipid syndrome patients. Rheumatology (Oxford) 57, 1264–1270. https://doi.org/10.1093/rheumatology/key082
72. Rodríguez-Pintó, I., Moitinho, M., Santacreu, I., Shoenfeld, Y., Erkan, D., Espinosa, G., Cervera, R., CAPS Registry Project Group (European Forum on Anti-phospholipid Antibodies), 2016a. Catastrophic anti-phospholipid syndrome (CAPS): Descriptive analysis of 500 patients from the International CAPS Registry. Autoimmun Rev 15, 1120–1124. https://doi.org/10.1016/j.autrev.2016.09.010
73. Rodríguez-Pintó, I., Moitinho, M., Santacreu, I., Shoenfeld, Y., Erkan, D., Espinosa, G., Cervera, R., CAPS Registry Project Group (European Forum on Anti-phospholipid Antibodies), 2016b. Catastrophic anti-phospholipid syndrome (CAPS): Descriptive

analysis of 500 patients from the International CAPS Registry. Autoimmun Rev 15, 1120–1124. https://doi.org/10.1016/j.autrev.2016.09.010

74. Saraf, S.S., Patel, Y.P., Desai, A., Desai, U.R., 2015. Catastrophic anti-phospholipid syndrome presenting as bilateral central retinal artery occlusions. Case Rep Ophthalmol Med 2015, 206906. https://doi.org/10.1155/2015/206906
75. Taraborelli, M., Reggia, R., Dall'Ara, F., Fredi, M., Andreoli, L., Gerosa, M., Hoxha, A., Massaro, L., Tonello, M., Costedoat-Chalumeau, N., Cacoub, P., Franceschini, F., Meroni, P.L., Piette, J.C., Ruffatti, A., Valesini, G., Harris, E.N., Tincani, A., 2017. Longterm Outcome of Patients with Primary Anti-phospholipid Syndrome: A Retrospective Multicenter Study. J Rheumatol 44, 1165–1172. https://doi.org/10.3899/jrheum.161364
76. Uthman, I., Khamashta, M., 2007. The abdominal manifestations of the anti-phospholipid syndrome. Rheumatology (Oxford) 46, 1641–1647. https://doi.org/10.1093/rheumatology/kem158
77. Yelnik, C.M., Miranda, S., Mékinian, A., Lazaro, E., Quéméneur, T., Provot, F., Frimat, M., Morell-Dubois, S., Le Guern, V., Hachulla, E., Costedoat-Chalumeau, N., Lambert, M., 2020. Patients with refractory catastrophic anti-phospholipid syndrome respond inconsistently to eculizumab. Blood 136, 2473–2477. https://doi.org/10.1182/blood.2020007499

SAPL pédiatrique

78. Abisror, N., Mekinian, A., Lachassinne, E., Nicaise-Roland, P., De Pontual, L., Chollet-Martin, S., Boddaert, N., Carbillon, L., Fain, O., 2013. Autism spectrum disorders in babies born to mothers with anti-phospholipid syndrome. Semin Arthritis Rheum 43, 348–351. https://doi.org/10.1016/j.semarthrit.2013.07.001
79. Alijotas-Reig, J., Esteve-Valverde, E., Ferrer-Oliveras, R., Sáez-Comet, L., Lefkou, E., Mekinian, A., Belizna, C., Ruffatti, A., Tincani, A., Marozio, L., Espinosa, G., Cervera, R., Ríos-Garcés, R., De Carolis, S., Latino, O., LLurba, E., Chighizola, C.B., Gerosa, M., Pengo, V., Lundelin, K., Rovere-Querini, P., Canti, V., Mayer-Pickel, K., Reshetnyak, T., Hoxha, A., Tabacco, S., Stojanovich, L., Gogou, V., Varoudis, A., Arnau, A., Ruiz-Hidalgo, D., Trapé, J., Sos, L., Stoppani, C., Martí-Cañamares, A., Farran-Codina, I., EUROAPS Study Group, 2019. The European Registry on Obstetric Anti-phospholipid Syndrome (EUROAPS): A survey of 1000 consecutive cases. Autoimmun Rev 18, 406–414. https://doi.org/10.1016/j.autrev.2018.12.006
80. Avcin, T., Cimaz, R., Silverman, E.D., Cervera, R., Gattorno, M., Garay, S., Berkun, Y., Sztajnbok, F.R., Silva, C.A., Campos, L.M., Saad-Magalhaes, C., Rigante, D., Ravelli, A., Martini, A., Rozman, B., Meroni, P.L., 2008. Pediatric anti-phospholipid syndrome: clinical and immunologic features of 121 patients in an international registry. Pediatrics 122, e1100-1107. https://doi.org/10.1542/peds.2008-1209
81. Bauman, M.E., Black, K., Kuhle, S., Wang, L., Legge, L., Callen-Wicks, D., Mitchell, L., Bajzar, L., Massicotte, M.P., Western Canadian Children's Heart Network WCCHN, 2009. KIDCLOT: the importance of validated educational intervention for optimal long term warfarin management in children. Thromb Res 123, 707–709. https://doi.org/10.1016/j.thromres.2008.07.012
82. Bouvier, S., Cochery-Nouvellon, E., Lavigne-Lissalde, G., Mercier, E., Marchetti, T., Balducchi, J.-P., Marès, P., Gris, J.-C., 2014. Comparative incidence of pregnancy

outcomes in treated obstetric anti-phospholipid syndrome: the NOH-APS observational study. Blood 123, 404–413. https://doi.org/10.1182/blood-2013-08-522623

83. Dieudonné, Y., Guffroy, A., Vollmer, O., Carapito, R., Korganow, A.-S., 2019. IKZF1 Loss-of-Function Variant Causes Autoimmunity and Severe Familial Anti-phospholipid Syndrome. J Clin Immunol 39, 353–357. https://doi.org/10.1007/s10875-019-00643-2
84. Gris, J.-C., Chauleur, C., Molinari, N., Marès, P., Fabbro-Peray, P., Quéré, I., Lefrant, J.-Y., Haddad, B., Dauzat, M., 2011. Addition of enoxaparin to aspirin for the secondary prevention of placental vascular complications in women with severe pre-eclampsia. The pilot randomised controlled NOH-PE trial. Thromb Haemost 106, 1053–1061. https://doi.org/10.1160/TH11-05-0340
85. Groot, N., de Graeff, N., Avcin, T., Bader-Meunier, B., Dolezalova, P., Feldman, B., Kenet, G., Koné-Paut, I., Lahdenne, P., Marks, S.D., McCann, L., Pilkington, C.A., Ravelli, A., van Royen-Kerkhof, A., Uziel, Y., Vastert, S.J., Wulffraat, N.M., Ozen, S., Brogan, P., Kamphuis, S., Beresford, M.W., 2017. European evidence-based recommendations for diagnosis and treatment of paediatric anti-phospholipid syndrome: the SHARE initiative. Ann Rheum Dis 76, 1637–1641. https://doi.org/10.1136/annrheumdis-2016-211001
86. Lageix, F., Nicaise-Roland, P., Houlier, M., Zylberberg, P., Dubrel, M., Heulin, M., Fain, O., Lachassinne, E., Héron, B., Chollet-Martin, S., Mekinian, A., de Pontual, L., 2015. [Association between the presence of anti-phospholipid antibodies and the occurrence of autism spectrum disorder in childhood]. Arch Pediatr 22, 1140–1146. https://doi.org/10.1016/j.arcped.2015.08.007
87. Mekinian, A., Carbillon, L., Nicaise-Roland, P., Rousseau, H., Lachassinne, E., Motta, M., Vicaut, E., Boinot, C., Avcin, T., De Carolis, S., Rovere-Querini, P., Lambert, M., Derenne, S., Pourrat, O., Chollet-Martin, S., Biasini-Rebaioli, R., Rovelli, R., Lojacono, A., Ambrozic, A., Benbara, A., Pierre, F., Allegri, F., Nuzzo, M., Hatron, P.-Y., Tincani, A., Aurousseau, M.-H., Boffa, M.-C., Fain, O., 2014. Mothers' anti-phospholipid antibodies during pregnancy and the relation to offspring outcome. Clin Exp Rheumatol 32, 446.
88. Mekinian, A., Costedoat-Chalumeau, N., Masseau, A., Tincani, A., De Caroli, S., Alijotas-Reig, J., Ruffatti, A., Ambrozic, A., Botta, A., Le Guern, V., Fritsch-Stork, R., Nicaise-Roland, P., Carbonne, B., Carbillon, L., Fain, O., 2015. Obstetrical APS: is there a place for hydroxychloroquine to improve the pregnancy outcome? Autoimmun Rev 14, 23–29. https://doi.org/10.1016/j.autrev.2014.08.040
89. Mekinian, A., Lachassinne, E., Nicaise-Roland, P., Carbillon, L., Motta, M., Vicaut, E., Boinot, C., Avcin, T., Letoumelin, P., De Carolis, S., Rovere-Querini, P., Lambert, M., Derenne, S., Pourrat, O., Stirnemann, J., Chollet-Martin, S., Biasini-Rebaioli, C., Rovelli, R., Lojacono, A., Ambrozic, A., Botta, A., Benbara, A., Pierre, F., Allegri, F., Nuzzo, M., Hatron, P.-Y., Tincani, A., Fain, O., Aurousseau, M.-H., Boffa, M.-C., 2013. European registry of babies born to mothers with anti-phospholipid syndrome. Ann Rheum Dis 72, 217–222. https://doi.org/10.1136/annrheumdis-2011-201167
90. Monagle, P., Chan, A.K.C., Goldenberg, N.A., Ichord, R.N., Journeycake, J.M., Nowak-Göttl, U., Vesely, S.K., 2012. Antithrombotic Therapy in Neonates and Children: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest 141, e737S-e801S. https://doi.org/10.1378/chest.11-2308
91. Monagle, P., Cuello, C.A., Augustine, C., Bonduel, M., Brandão, L.R., Capman, T., Chan, A.K.C., Hanson, S., Male, C., Meerpohl, J., Newall, F., O'Brien, S.H., Raffini, L., van

Ommen, H., Wiernikowski, J., Williams, S., Bhatt, M., Riva, J.J., Roldan, Y., Schwab, N., Mustafa, R.A., Vesely, S.K., 2018. American Society of Hematology 2018 Guidelines for management of venous thromboembolism: treatment of pediatric venous thromboembolism. Blood Advances 2, 3292–3316. https://doi.org/10.1182/bloodadvances.2018024786

92. Newall, F., Jones, S., Bauman, M., Bruce, A., Massicotte, M.P., Monagle, P., the Subcommittee on Perinatal and Paediatric Haemostasis, 2015. Recommendations for the development of a dedicated pediatric anticoagulation service: communication from the SSC of the ISTH. Journal of Thrombosis and Haemostasis 13, 155–159. https://doi.org/10.1111/jth.12763
93. Newall, F., Monagle, P., Johnston, L., 2006. Home INR monitoring of oral anticoagulant therapy in children using the CoaguChek S point-of-care monitor and a robust education program. Thromb Res 118, 587–593. https://doi.org/10.1016/j.thromres.2005.08.004
94. Rosina, S., Chighizola, C.B., Ravelli, A., Cimaz, R., 2021. Pediatric Anti-phospholipid Syndrome: from Pathogenesis to Clinical Management. Curr Rheumatol Rep 23, 10. https://doi.org/10.1007/s11926-020-00976-7
95. Sloan, E., Wright, T., Zuo, Y., 2021. Identifying additional risk factors for arterial and venous thrombosis among pediatric anti-phospholipid antibodies carriers. Lupus 30, 828–832. https://doi.org/10.1177/09612033211002256
96. Soybilgic, A., Avcin, T., 2020. Pediatric APS: State of the Art. Curr Rheumatol Rep 22, 9. https://doi.org/10.1007/s11926-020-0887-9
97. Wincup, C., Ioannou, Y., 2018. The Differences Between Childhood and Adult Onset Anti-phospholipid Syndrome. Front Pediatr 6, 362. https://doi.org/10.3389/fped.2018.00362