

Les accidents vasculaires cérébraux en réanimation pédiatrique

GUETTECHE Choubeila

Réanimation médicale CHU Constantine

Problématique

○ Pathologie **fréquente** chez l'adulte

○ Pathologie **rare** chez l'enfant



AVC ischémique
1/ 3500 nouveau né
1-2/100000 enfant

Problématique

- Présentation clinique atypique.
- Modifications liée à l'âge.
- Etiologies multiples.

- Publications rare.

Problématique

- Absence de données nationales.

Objétif principal

Préciser :

- Profil épidémiologique et clinique
- Etiologique
- Evolution

« Enfants atteints d'AVC ischémique ou hémorragique admis en réanimation médicale ».

Matériels et méthodes

- Etude observationnelle rétrospective.
- Service de réanimation médicale CHU Constantine.
- Période 2013-2018.

Critères d'éligibilité

Critère d'inclusion

- Enfants admis en réanimation pour AVC ischémique ou hémorragique.

Critères d'éligibilité

Critère de non inclusion

- Nouveau né.
- Enfants admis en réanimation pour thrombophlébite cérébrale.

Critères d'éligibilité

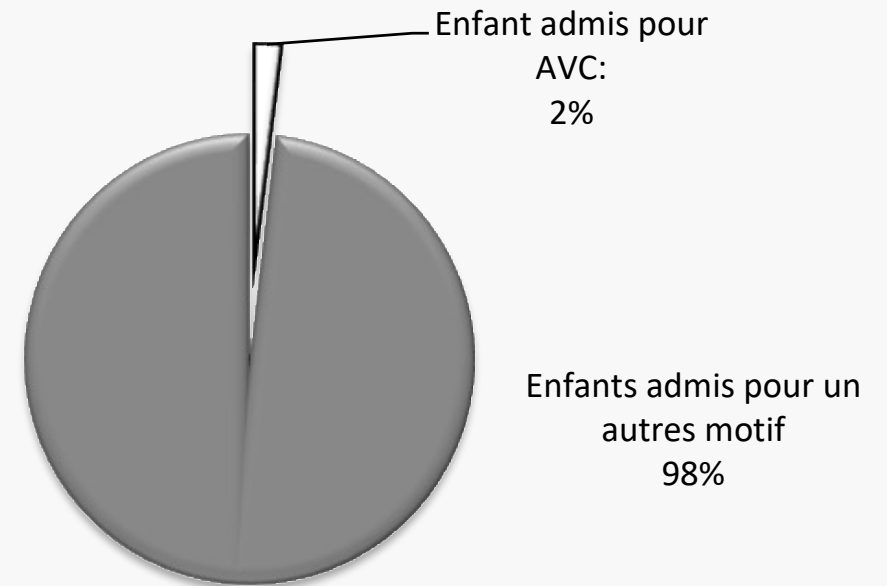
Paramètres étudié

Spécificité de

- Présentation clinique.
- Le délais diagnostic.
- Les étiologies et l'évolution.

Résultat

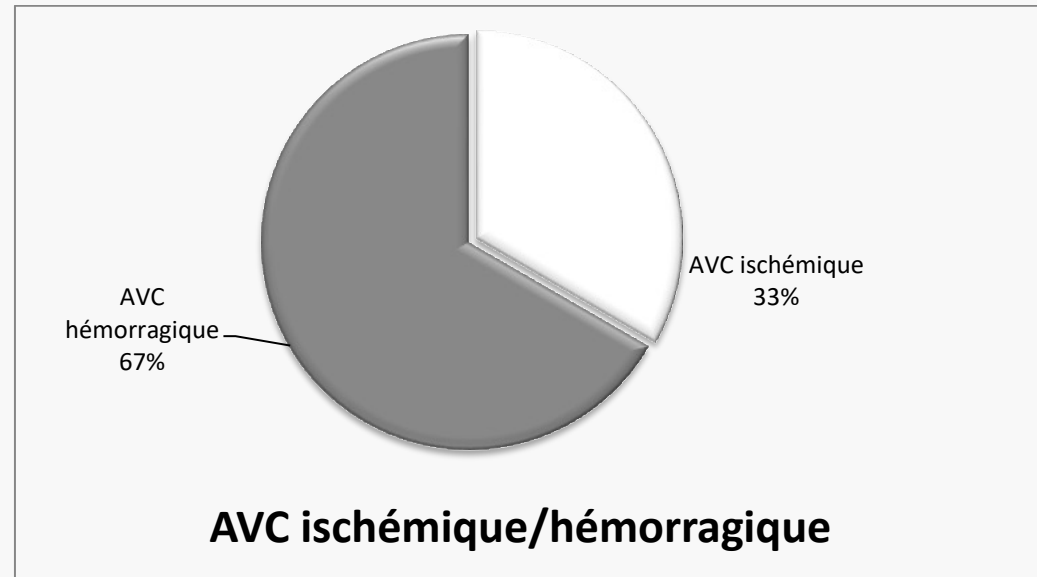
Nombre de malade **24**



Pourcentage D'admission des AVC

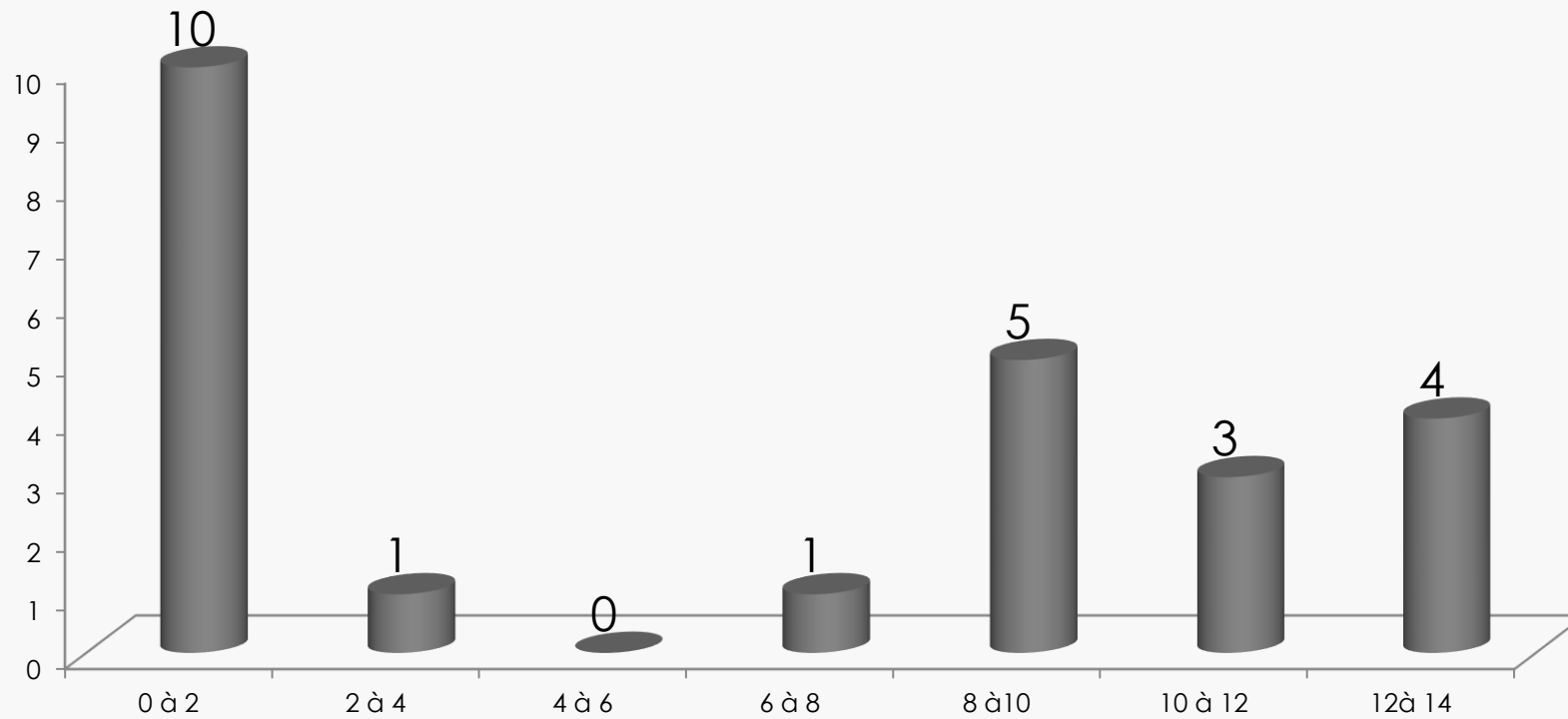
Résultat

Nature de l'AVC



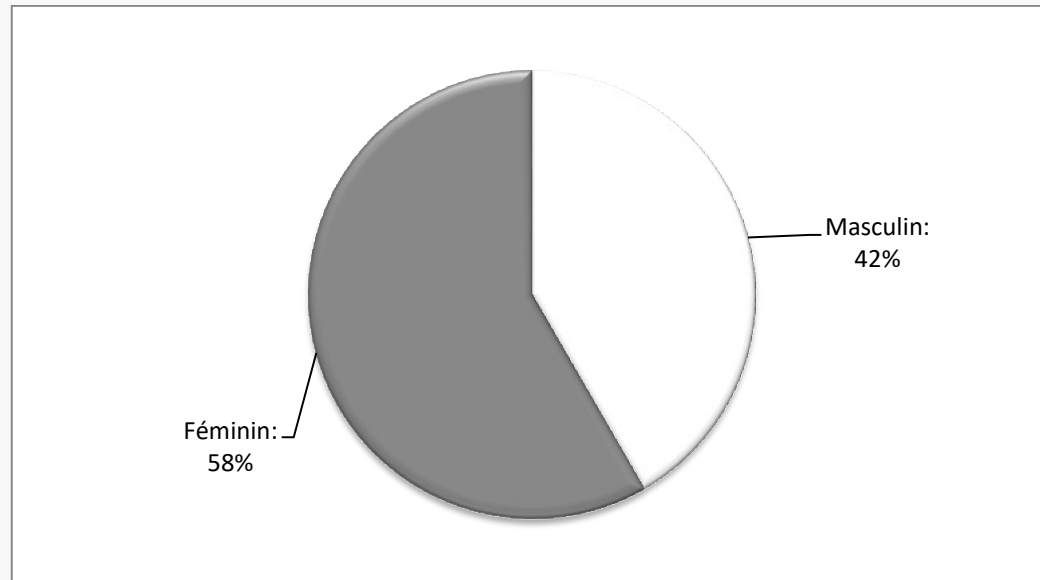
Résultats:

Âge



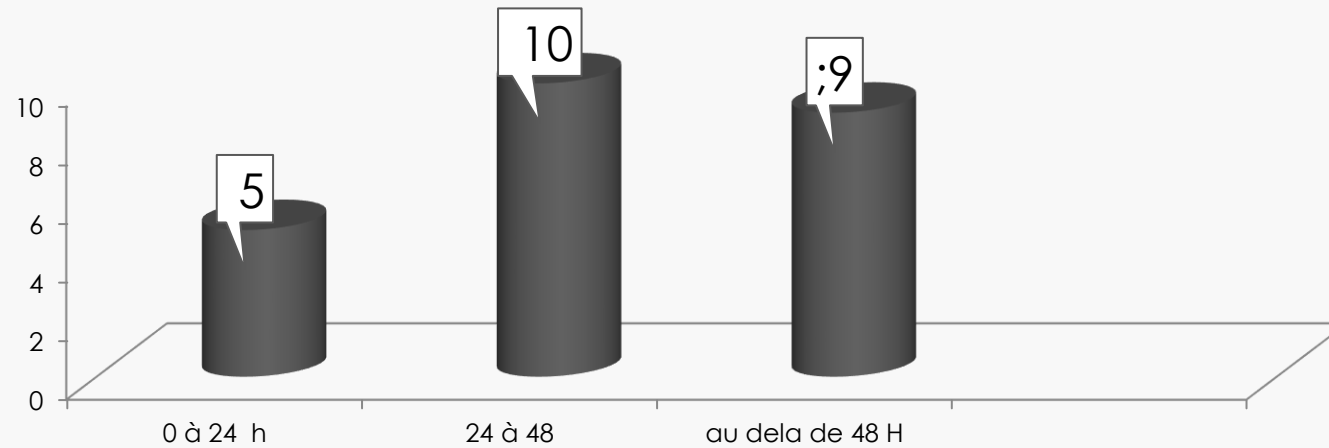
Résultats:

Sexe



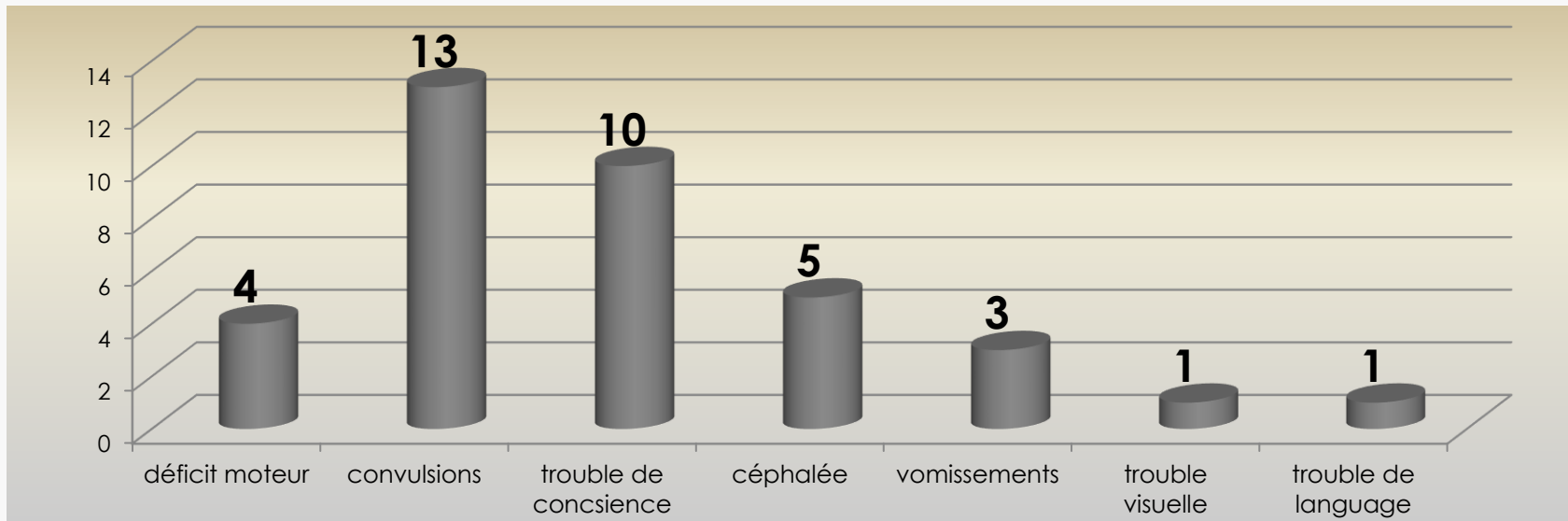
Résultats:

Délais de diagnostic



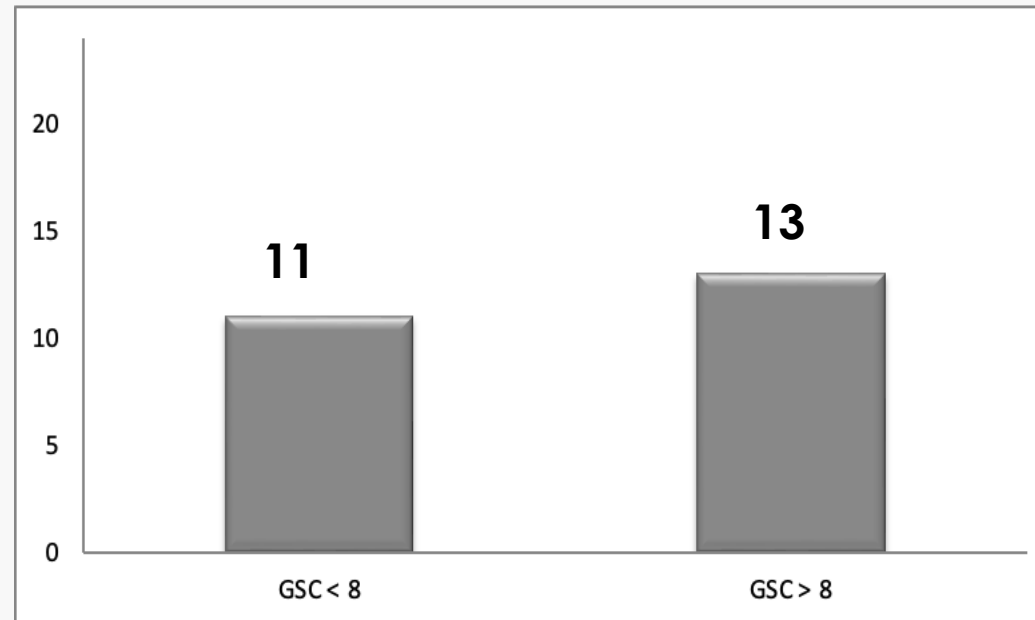
Résultats:

Présentation clinique



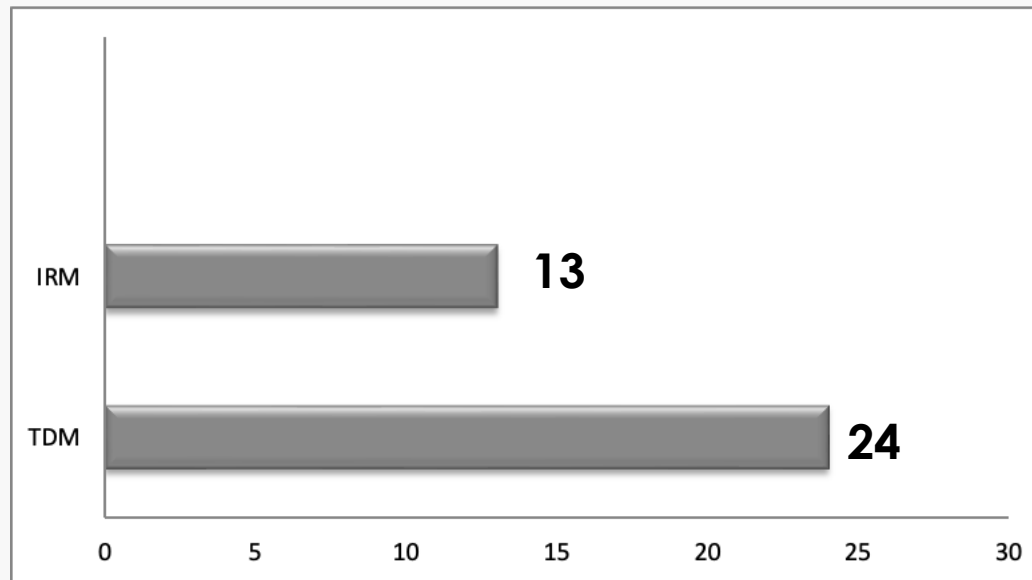
Résultats:

Présentation clinique



Résultats:

Paraclinique



Résultats:

Paraclinique

TDM cérébrale AVC
hémorragique chez une fille de 14
ans.



Résultats:

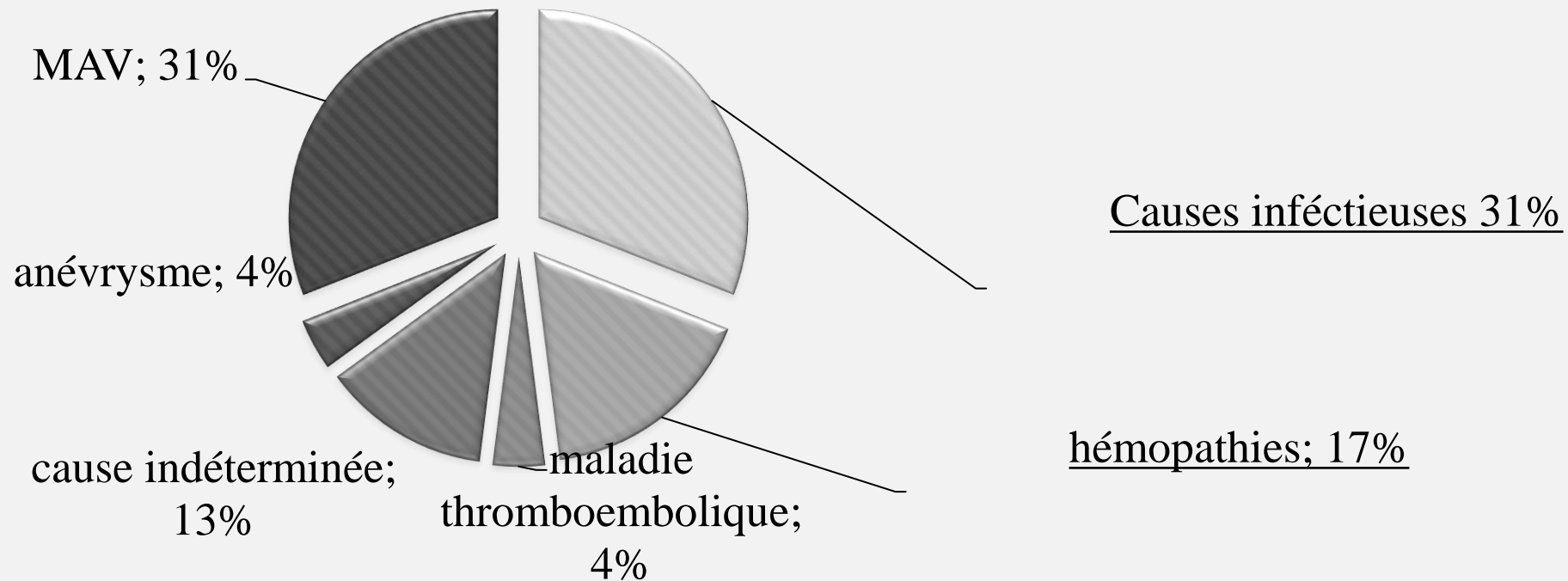
Paraclinique

IRM cérébrale AVC ischémique
chez un nourrisson de 9 mois



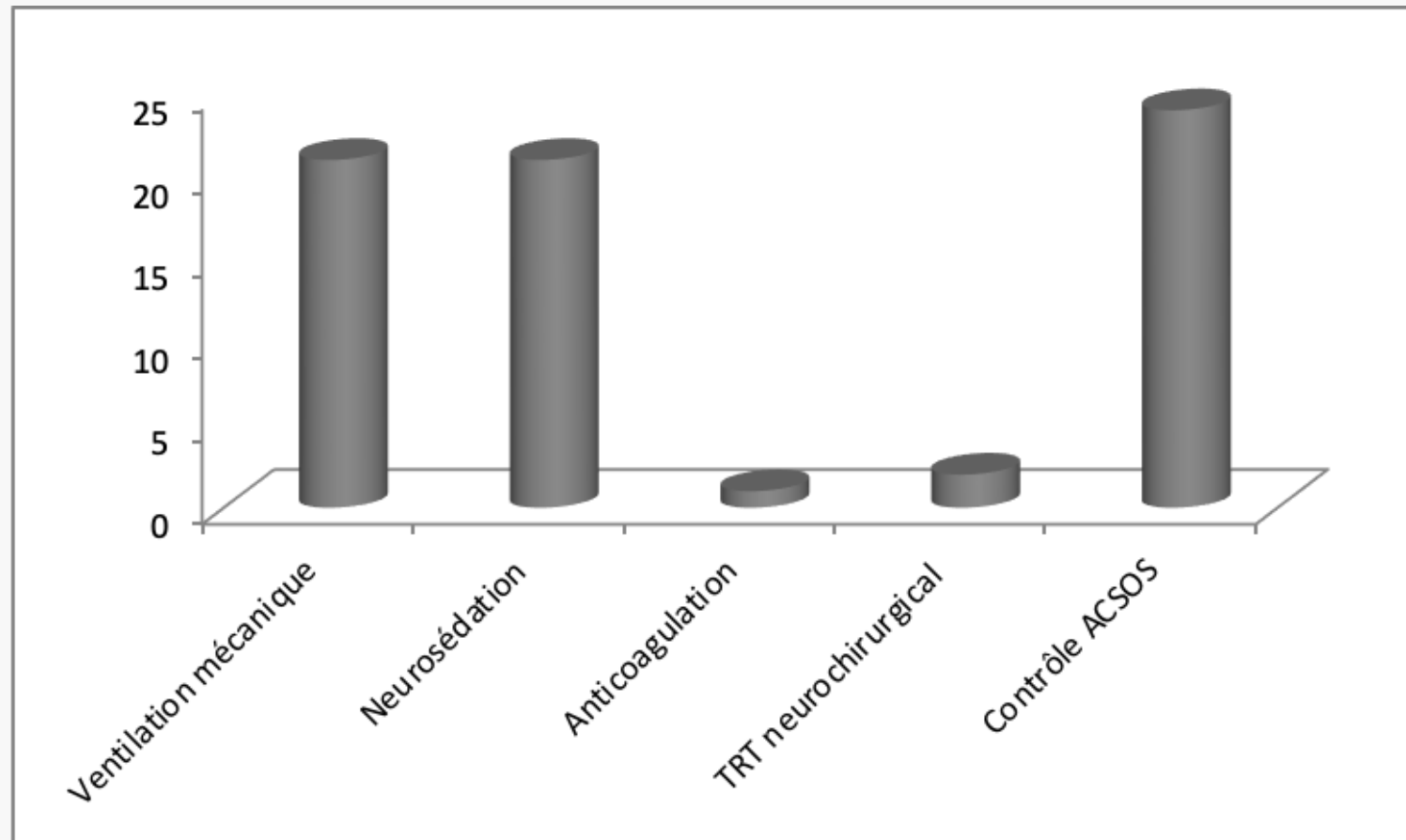
Résultats :

Etiologies



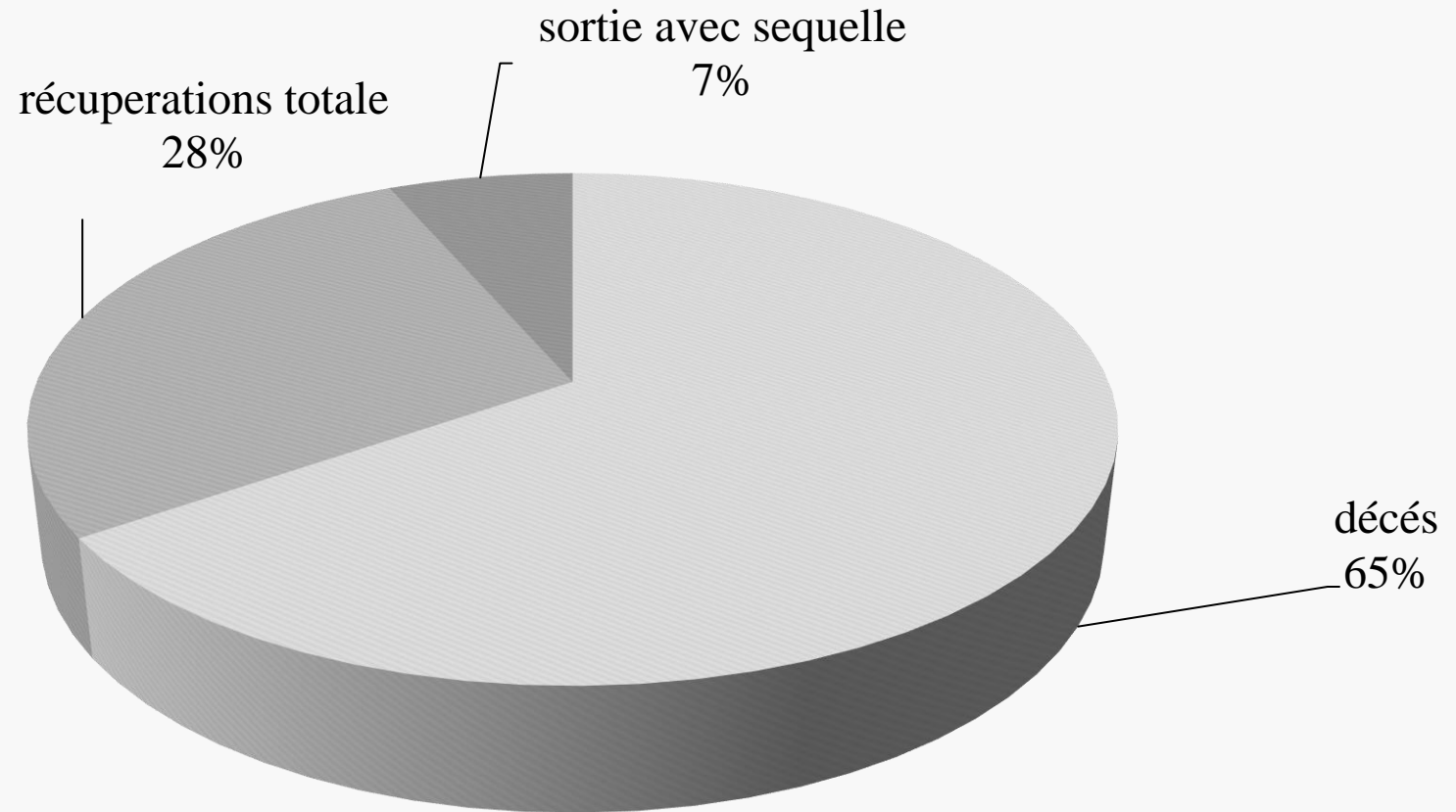
Résultats :

Etiologies



Résultats

Evolution



Discussion:

Présentation clinique

- Diagnostic **précoce difficile** : variabilité des signes d'appel
- **Etiologies** multiples : malformations artério-veineuse, hémopathies (AVC hémorragique), pathologies infectieuses et inflammatoires (AVC ischémique).
- **Mortalité élevée** (Gravité de tableau clinique initial) :
 - ✓ Retard de diagnostic
 - ✓ Absence de centre neuro-vasculaire

Table 2 Main published institutional protocols about the management of pediatric stroke in the last 5 years ^{49, 50, 52, 53, 54, 55}

Article	No. of enrolled patients	Number of patients diagnosed with arterial ischemic stroke	Time of application of protocol	Main symptoms at onset	PedNIHSS	Time to neuroimaging	Number of treated patients	% of success of treatment	Number of patients with complications
Rivkin et al. (2019) ⁴⁹	65 pt presenting with brain attack symptoms	6	2.5 years	Focal motor symptoms, sensory deficit, headache	< 4 (65% patients); > 4 (32% patients); not documented in 3 patients	82 min	Not available	Not available	Not available
Tabone et al. (2017) ⁵⁰	13 patients with acute ischemic stroke	13	3.3 years	Focal motor symptoms, language disorder	Median ped-NIHSS 10	165 min	15 (11 pt rTPA, 4 pt endovascular procedure)	Not available	No intracranial or peripheral bleeding after treatment. One early death (malignant stroke). mRS score at 3 months 0–2
Ladner et al. (2015) ⁵⁵	124 stroke alerts	21	3 years	Focal motor symptoms, altered mental status, headache	Not available	94 min (to MRI) 59 min (to CT)	11 (1 pt rTPA, 2 pt mechanical thrombectomy)	Not available	Median pediatric stroke outcome measure 0.75 (IQR, 0–2.13), mild-to-moderate ongoing neurological deficits with effect on function
DeLaroche et al. (2016) ⁵²	36 stroke alert activations	7	4 years	Neurological deficit, headache, altered mental status, gait abnormalities, seizures	Not available	46 min (to CT) 320 min (to MRI)	Not available	100%	None patient reported complications (64% of pts are discharged home. 36% to in-patients rehabilitation. No deaths)
Shack et al. (2016) ⁵³	112	122	7 years	Not available	Median ped-NIHSS 7 (4–12)	90 min	Not available	Not available	Not available
Wharton et al. (2020) ⁵⁴	385 stroke alert activation	80 stroke (not specified acute ischemic/haemorrhagic)	7 years	Not available	Median ped-NIHSS 7.5–10	79 min	57 (0 pt rTPA, 4 pt endovascular procedure)	Not available	Not available

Acute systemic conditions 22-9%	Infectious diseases
	Sepsis
	Shock
	Acidosis/Anoxia
	Other
Haemato oncological 9-19%	Sickle cell disease
	Haemolytic/ iron deficiency anemia
	Haematological malignancy
	Solid extracranial tumors
	Other
Chronic head and neck disorders 9-10%	Brain tumors
	Aneurysm/ arterio-venous malformations
	Other cranial/ neck tumors
	Migraine
	Other
Genetic/ metabolic 1%	Mitochondriopathy (e.g. MELAS, POLG1 mutation)
	Fabry disease
	PHACE syndrome
	ACTA 2/ COL4A1 mutation
	Trisomy 21
	Deficiency of Adenosine Deaminase 2
	Connective tissue disorders (e.g. Ehlers Danlos- /Marfan-/Loeys Dietz syndrome)
Other 10%	Previous brain surgery
	Trauma

Arteriopathies (intra and extracranial) 21-53%	Moya Moya
	Sickle cell arteriopathy
	Post- varicella arteriopathy
	Arterial dissection
	Primary CNS vasculitis
	Para-/post infectious vasculitis
	Fibromuscular dysplasia
Cardiac 24-31%	Congenital/ acquired heart diseases
	Patent foramen ovale (PFO)
	Arrhythmia
	Previous cardiac surgery/ catheterization
	Endocarditis
	Other
Hypercoagulable state 28-13%	Protein C deficiency
	Protein S deficiency
	Factor V Leiden mutation (G1691A)
	Prothrombin mutation (PTG20210A)
	MTHFR (C677T polymorphism)
	Antithrombin III deficiency
	Increased factor VIII
	Hyperlipoproteinemia (alpha)
	Lupus anticoagulant

Discussion: Prise en charge

TRIAGE AND FIRST EVALUATION IN ED

HISTORY TAKING AND CLINICAL EVALUATION

- 1- **Consider age-related risk factor for stroke (ATTACHMENT A) ***
- 2- **Symptoms (acute onset?):** a) Unilateral strength deficit; b) Visual deficit or diplopia; c) Speech disturbance; d) Vertigo or ataxia; e) Altered consciousness; f) Headache; g) Epileptic seizure; h) Other aspects (e.g. Cardiac diseases? Medications? Recent surgery? Recent varicella infection?).
- 3- **Timing of symptom onset:**
 - 0-4,5 h → Consider TPA e.v. and/or endovascular thrombectomy
 - 4,5-6 h → Consider endovascular thrombectomy (Inr evaluation)
- 4- **Sort patients according to therapeutic possibility**
 - **0-2 years: NOT CANDIDATE → Support therapy in PICU or pediatric ED**
 - **2-14 years: POSSIBLY CANDIDATE → Management in PICU or pediatric ED**
 - **14> years: POSSIBLY CANDIDATE → Management in ANICU**

Neuroimaging CRITERIA:

- 1- Excluded intracranial haemorrhage**
- 2- Signs of ischemia**
- 3- Large vessel occlusion (anterior and posterior circulation)**

YES

NO

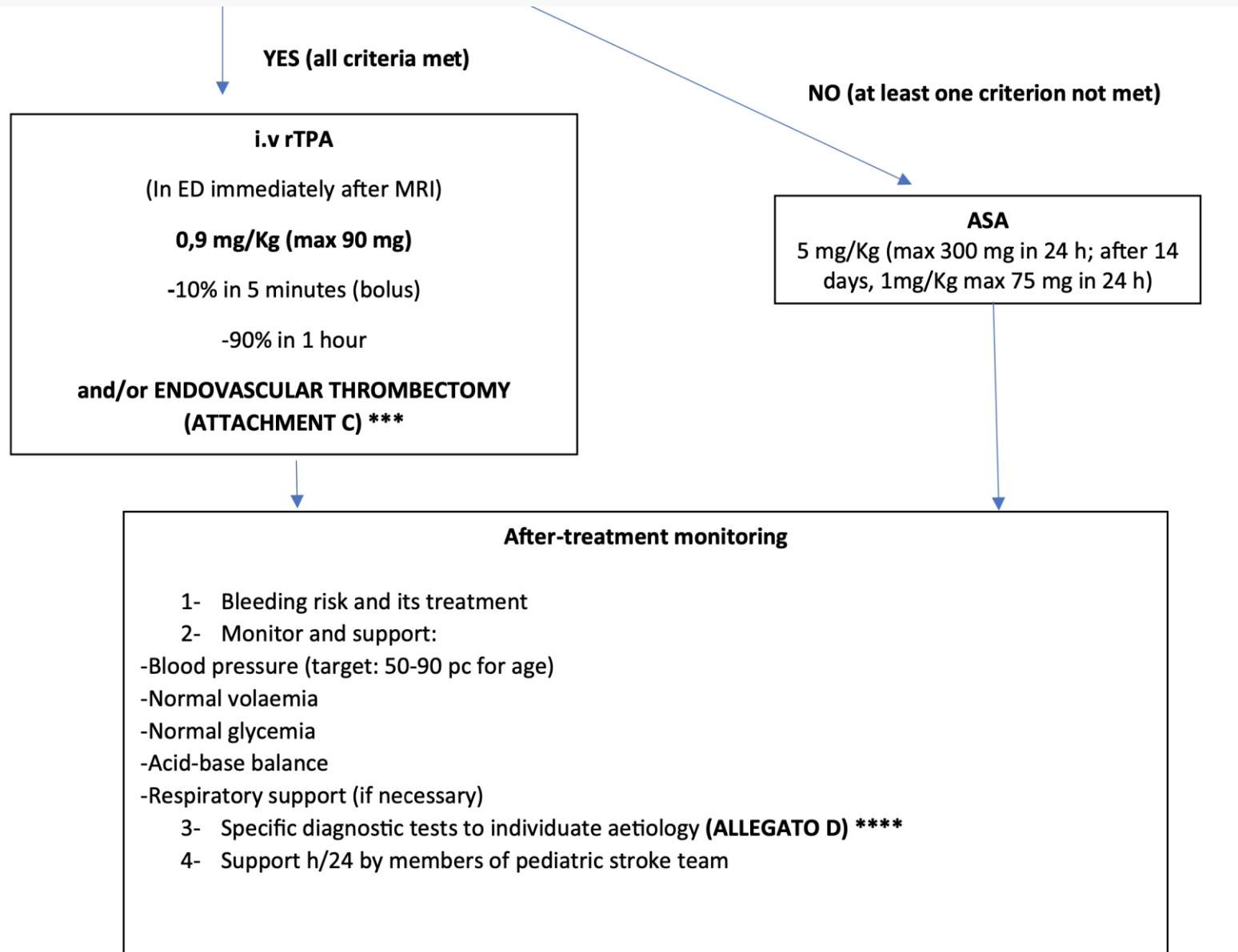
INCLUSION CRITERIA FOR i.v. rTPA

- 1- within 4.5 hours of known onset of symptoms**
- 2- more than two years of age**
- 3- acute focal neurological deficit and pedNIHSS ≥ 6 e ≤ 24**
- 4- no contraindications (ATTACHMENT B)****

INCLUSION CRITERIA FOR ENDOVASCULAR THROMBECTOMY (ATTACHMENT C)***

Hospitalization in NICU (age <28 days) or PICU (ED if no bed available) or pediatric ward (if not critical conditions)

- 1- Neuroprotective or support therapy**
- 2- Consider other invasive diagnostic procedures (angiography? Lumbar puncture?)**
- 3- Endovascular therapy**
- 4- Non-invasive diagnostic test to individuate etiology**



Conclusion

- Pathologie **rare** mais **grave**.
- Approche épidémiologique par le biais d'études multicentriques est nécessaire.
- **Spécificité clinique** pouvant égarer le diagnostic souvent retardé.

Conclusion

- **Intérêt d'optimisation** de modalités d'investigations radiologiques.
- Intérêt de centres neuro-vasculaires et formalisation des recommandations spécifiques à l'enfant.