anoCor

JOURNÉES EUROPÉENNES de la SOCIÉTÉ FRANÇAISE de CARDIOLOGIE

Paris, 14-17 janvier 2015

ANOmalous connections of the CORonary arteries: Observational cohort of more than 450 young people or adults (ANOCOR registry)

Pierre Aubry (Paris), Xavier Halna du Fretay (Orléans), Patrick Dupouy (Antony), Guillaume Leurent (Rennes), Matthieu Godin (Rouen), Loïc Belle (Annecy), Philippe Couppie (Haguenau), Phalla Ou (Paris), Jean-Michel Juliard (Paris), on behalf of the ANOCOR investigators.

GACI

Groupe Athérome et Cardiologie Interventionnelle de la Société Française de Cardiologie

JE SUIS CHARLIE

Conflict of interest: nothing to report

anoCor

Research grant from

GACI

Groupe Athérome et Cardiologie Interventionnelle
de la Société Française de Cardiologie

Rationale

- Rare abnormalities (5/1000 invasive CA)
- Lot of case reports
- Heterogeneous management
- Lack of established evidence-based guidelines
- Need of a risk stratification model
- Few prospective studies with large cohorts

(AAOCA / ANOCOR)

AAOCA: anomalous aortic origin of coronary artery
ANOCOR: anomalous connections of the coronary arteries
CA: coronary angiography

Calendar

Investigators recruitment period	01/2009 - 01/2010
Patients recruitment period	01/2010 - 01/2013
Angiographic analysis phase	12/2010 - 12/2014
Database analysis phase	09/2014
End of 5-years follow-up	01/2018

ANOCOR investigators

(n = 71)

GACI
Groupe Athérome et Cardiologie Interventionnelle de la Société Française de Cardiologie

Abi Khalil Wissam
Aguirre Luc
Akesbi Abdel
Aubry Pierre
Banus Yves
Belle Loïc
Benamer Hakim
Biron Yves
Boiffard Emmanuel
Bouallal Rachid
Boudvillain Olivier
Bourkaïb Ryad
Brasselet Camille
Bressollette Erwan
Brunel Philippe
Champagnac Didier
Coco Michel
Commeau Philippe
Cook Stéphane
Couppie Philippe
De Poli Fabien
Delorme Laurent
Descoutures Fleur
Didier Romain
Ducrocq Gregory
Dupouy Patrick
Durier Chloé
Gérardin Benoît
Gibault-Genty Géraldine
Gilard Martine
Godin Matthieu
Goy Jean-Jacques
El Mahmoud Rami
Estève Jean-Baptiste
Faurie Benjamin
Garbarz Eric
Georges Jean-Louis
Haffner-Debus Claire
Halna du Fretay Xavier
Hanssen Michel
Hascoet Sébastien
Jacquemin Laurent
Jeanneteau Julien
Joseph Thierry
Juliard Jean-Michel
Karsenty Bernard
Koning René
La Scala Eugénio
Leddet Pierre
Lemesle Gilles
Leurent Guillaume
Levy Raphy
Livarek Bernard
Loubeyre Christophe
Maillard Luc
Mangin Lionel
Marlière Stéphanie
Nejjari Mohammed
Ohlmann Patrick
Poulos Nabil
Py Antoine
Ranc Sylvain
Rialan Antoine
Roriz Ricardo
Rougier Pierre
Staat Patrick
Thuaire Christophe
Togni Mario
Van Rothem Jérôme
Varenne Olivier
Voudris Vassilis

Design

Diagnosis of ANOCOR by investigator

Medical report + compact discs of coronary angiography

Data center : Department of Cardiology - Bichat Hospital

Angiographic analysis committee

Enrollment in ANOCOR study

Follow-up questionnaire at 1, 3 and 5 years

Study endpoints

- Primary endpoint:
  - to determine the therapeutic strategy of diagnosed patients with ANOCOR

- Secondary endpoints:
  - to identify the circumstances of diagnosis
  - to describe the frequency of each type of ANOCOR
  - to evaluate the morbimortality in the follow-up period according to the initial therapeutic strategy

Inclusion criteria

- proximal anomalous connection of ≥ one coronary artery
- coronary angiography (invasive or CT scan or MRI) ≤ 6 months
- age ≥15 years at time of diagnosis
- verbal consent

CT: computed tomography
MRI: magnetic resonance imaging

Non inclusion criteria

- significant congenital structural heart disease*
- known anomaly prior to coronary angiography
- life expectancy ≤ 12 months**

* except PDA, ASD, VSD, bicuspid aortic valve

** in relation with a non cardiovascular disease

Recruited patients
n = 490

Non enrolled patients
n = 12

- 6 non ANOCOR
- 4 anatomical variants
- 1 doubloon
- 1 out of time

Non analysed patients
n = 17

?

Enrolled patients
n = 461

Angiographic analysis committee

- Patrick Dupouy
- Jean-Michel Juliard
- Jean-Pierre Laissy
- Phalla Ou

Steering committee

- Pierre Aubry
- Candice Estellat
- Reza Farnoud
- Xavier Halna du Fretay

Patient characteristics

(n = 399 patients)

Gender (male/female) (n, %)	285 (71) / 114 (29)
Age (years) (mean ± SD)	64.0 ± 13.2
Age (years) (min - max)	16 - 95
Age (years) (n, %) ≤ 35 > 35	 16 (4.0) 383 (96.0)

Cardiovascular history
(n = 399 patients)

No history (n, %)	288 (72.2)
Myocardial infarction (n, %)	34 (8.6)
Coronary angioplasty (n, %)	30 (7.7)
Coronary or valvular surgery (n, %)	10 (2.6)
Significant valvular disease (n, %)	46 (11.6)
Non ischemic cardiomyopathy (n, %)	20 (5.1)

Cardiovascular risk factors

(n = 399 patients)

Smoking (n, %)	84 (21.1)
Hypertension (n, %)	217 (54.4)
Diabetes (n, %)	78 (19.5)
Dyslipidemia (n, %)	189 (47.4)

Clinical presentation
(n = 399 patients)

Asymptomatic (n, %)	31 (7.8)
Confirmed or suspected CAD (n, %)	249 (62.4)
Atypical chest pain (n,%)	57 (13.9)
Cardiomyopathy or valvulopathy (n, %)	67 (16.9)
Shortness of breath (n, %)	114 (28.8)
Dizziness (n, %)	35 (8.8)
Palpitations (n, %)	37 (9.3)
Syncope (n, %)	11 (2.8)
Aborted sudden death (n, %)	9 (2.2)

First imaging modality
(n = 393 patients)

Invasive CA (n, %)	356 (89.9)
Coronary CT scan (n, %)	39 (9.9)
Cardiac MRI (n, %)	1 (0.2)

CA: coronary angiography
CT: computed tomography
MRI: magnetic resonance imaging

Imaging modalities
(n = 398 patients)

Invasive CA alone (n, %)	249 (62.6)
Invasive CA + coronary CT scan (n, %)	123 (30.9)
Invasive CA + cardiac MRI (n, %)	11 (2.8)
Coronary CT scan alone (n, %)	15 (3.8)

CA: coronary angiography
CT: computed tomography
MRI: magnetic resonance imaging

Angiographic data*
Number of ANOCOR
(n = 399 patients)

Single ANOCOR (n, %)	394 (98.7)
Multiple ANOCOR (n, %)	5 (1.3)

* in relation with angiographic analysis committee
** 3 patients with two ANOCOR, 2 patients with three ANOCOR
ANOCOR: anomalous connections of the coronary arteries

ANOCOR: anomalous connections of the coronary arteries

Angiographic data
Type of coronary artery
(n = 372)

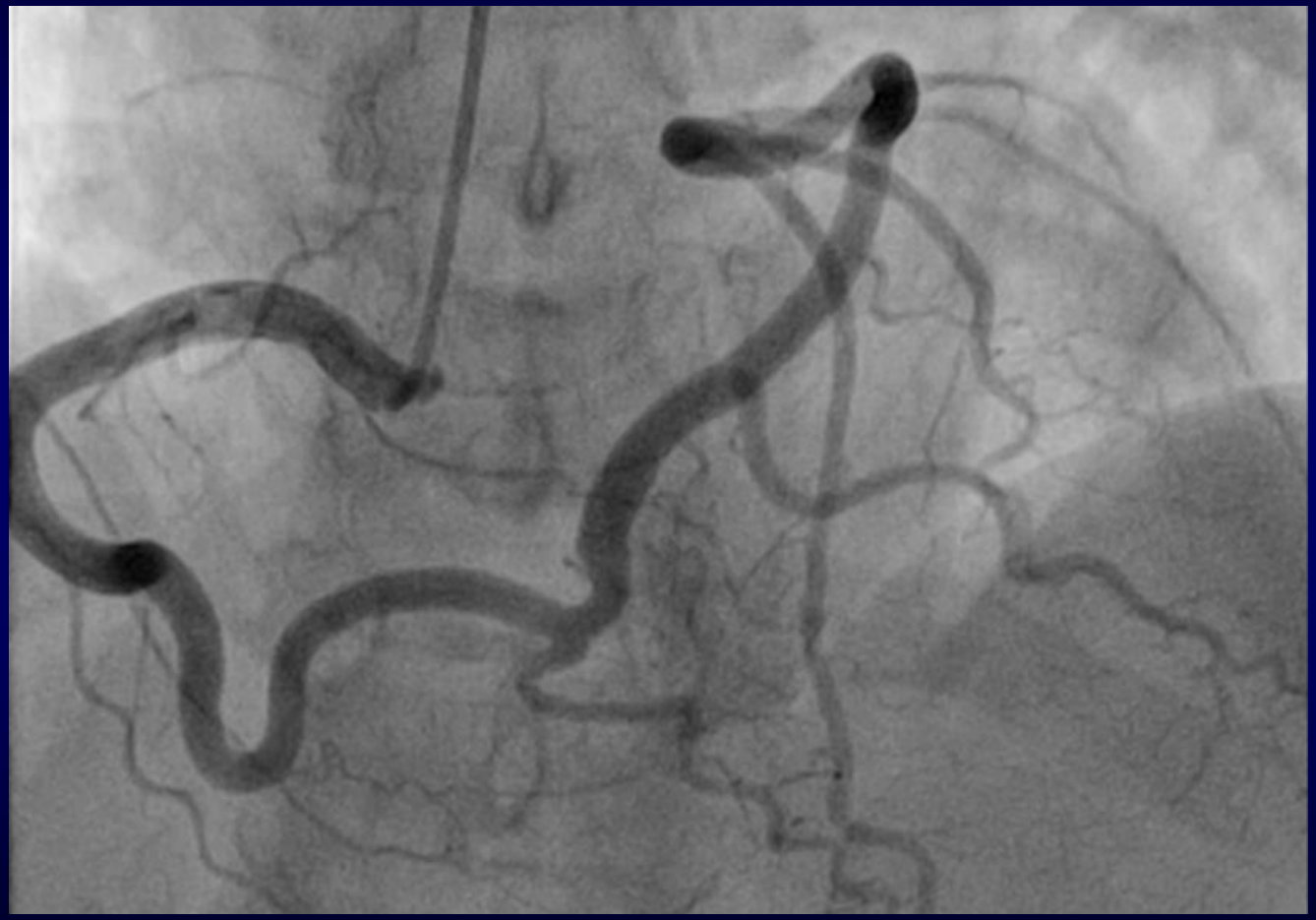
Left main coronary artery (n, %)	43 (11.6)
LAD coronary artery (n, %)	12 (3.2)
Circumflex coronary artery (n, %)	194 (52.2)
Right coronary artery (n, %)	123 (33.0)

LAD: left anterior descending

Angiographic data
Type of connection
(n = 368)

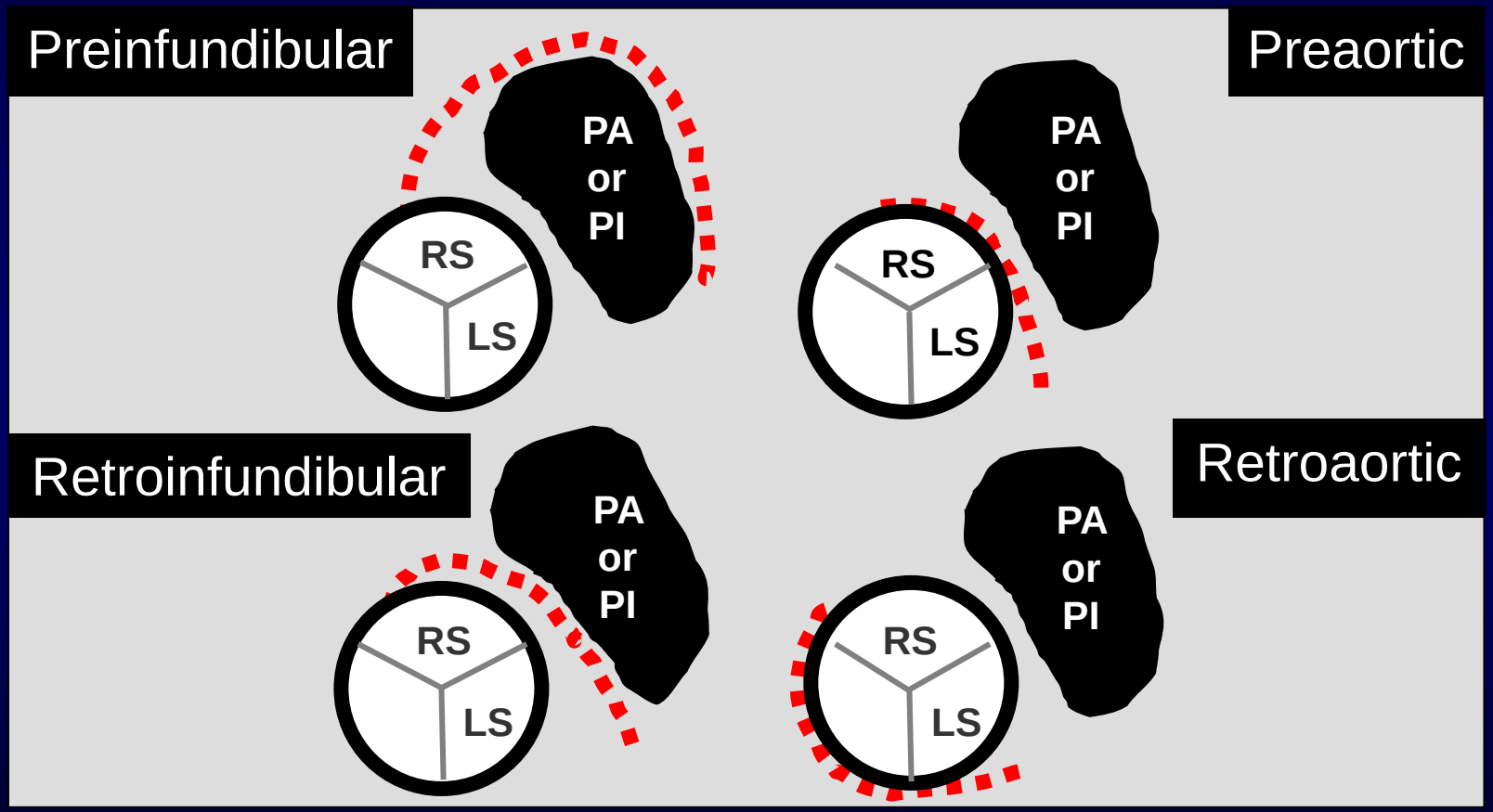
Opposite sinus (n, %)	170 (46.2)
Contralateral artery (n, %)	164 (44.6)
Appropriate sinus (n, %)	4 (1.1)
Non coronary sinus (n, %)	1 (0.3)
Above the sinotubular jonction (n, %)	20 (5.4)
Single coronary artery (n, %)	5 (1.3)
Pulmonary artery (n, %)	4 (1.1)

Type of connection



Single coronary artery

Type of course



PA: pulmonary artery, PI : pulmonary infundibulum
LS: left sinus, RS: right sinus

Type of course

Retroinfundibular course

Preaortic course

Angiographic data
Type of course
(n = 401)

Left main or LAD coronary artery (n)	50
Preinfundibular course (n, %)	17 (34.0)
Retroinfundibular course (n, %)	23 (46.0)
Preaortic course (n, %)	4 (8.0)
Retroaortic course (n, %)	6 (12.0)
Circumflex coronary artery (n)	194
Retroaortic course (n, %)	191 (98.4)
Other courses (n, %)	3 (1.6)
Right coronary artery (n)	119
Preaortic course (n, %)	111 (89.0)
Other courses (n, %)	8 (11.0)

LAD: left anterior descending

Type of course

Angiographic data
Risk classification

High-risk ANOCOR

- Anomalous connection with a preaortic course
- Anomalous connection with the pulmonary artery

ANOCOR: anomalous connections of the coronary arteries

High-risk ANOCOR

Angiographic data
Risk classification
(n = 401)

Low-risk ANOCOR (n, %)	279 (69.6)
High-risk ANOCOR (n, %)	119 (30.7)
Non defined risk (n, %)	3 (0.7)

ANOCOR: anomalous connections of the coronary arteries

Angiographic data
Associated CAD

ANOCOR (n patients)	385
Proximal lesions ≥50% (n, %)	47 (12.2)
Distal lesions ≥50% (n, %)	83 (21.6)
Non ANOCOR (n patients)	357
No significant lesions (n, %)	115 (32.3)
Lesions < 50% (n, %)	84 (23.5)
Lesions ≥ 50% (n, %)	163 (45.7)

ANOCOR: anomalous connections of the coronary arteries
CAD: coronary artery disease

Associated CAD

CAD: coronary artery disease

Management

Management of ANOCOR (n)	408
No treatment (n, %)	264 (67.2)
Medical treatment alone (n, %)	69 (17.3)
Angioplasty (n, %)	34 (8.7)
Surgery (n, %)	16 (4.1)
Awaiting decision (n, %)	25 (6.4)
Other managements (n)	381
No treatment (n,%)	70 (10.9)
Medical treatment alone (n, %)	132 (35.7)
Angioplasty (n, %)	106 (28.6)
Coronary or valvular surgery (n, %)	53 (13.3)
Awaiting decision (n, %)	20 (5.4)

ANOCOR: anomalous connections of the coronary arteries

Conclusions

- ANOCOR population (n = 461) is currently the largest cohort dedicated to anomalous connections of coronary arteries in adults
- Discovery of ANOCOR is generally fortuitous in adults ≥ 35 y
- Anomalous connection of the circumflex coronary artery is the most frequent ANOCOR
- Anomalous connection of the right coronary artery is almost aways associated with a preaortic course
- Surgical repair is rarely proposed in adults with high-risk ANOCOR

ANOCOR: anomalous connections of the coronary arteries

In the next

- Evaluation of morbimortality at 5 years
- Natural history of high-risk ANOCOR in adults
- Specific features of symptomatic ANOCOR
- Comparison of angiographic analysis between investigator and committee
- Angiographic analysis of intramural pathway
- Risk stratification model in adults with ANOCOR

ANOCOR: anomalous connections of the coronary arteries

Informations

www.sfcardio.fr

Groupes et filiales - GACI - registres - ANOCOR

Informations

multidisciplinary ANOCOR group
contact: pcaubry@yahoo.fr

Pierre Aubry (Paris)
Patrick Dupouy (Antony)
Xavier Halna du Fretay (Orléans)
Jean-Michel Juliard (Paris)
Jean-Pierre Laissy (Paris)
Phalla Ou (Paris)

GROUPE HOSPITALIER BICHAT-CLAUDE BERNARD