

# Two ways to give a calming medicine to children with heart disease before submitting them to anesthesia for cardiac surgery or catheterization. Which works better for them?

<b>Submission date</b> 05/04/2026	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered
		<input type="checkbox"/> Protocol
<b>Registration date</b> 09/04/2026	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
<b>Last Edited</b> 09/04/2026	<b>Condition category</b> Circulatory System	<input type="checkbox"/> Individual participant data
		<input checked="" type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

The study aims to assess the safety and effectiveness of two different routes of administration of midazolam as premedication for children with congenital heart disease allocated to receive general anesthesia in the theatre or cath lab.

### Who can participate?

Children aged 6 months to 8 years with heart disease allocated to receive general anesthesia

### What does the study involve?

Participants are randomly allocated to receive midazolam as premedication either by mouth or under the tongue. Midazolam concentration is measured in blood samples 30 min after intake, along with blood pressure, heart rate, oxygen saturation, sedation, separation from parents, and mask acceptance.

### What are the possible benefits and risks of participating?

The benefits of premedication before anesthesia are to reduce preoperative anxiety and fear and to improve anesthesia induction. Children with congenital heart problems usually undergo interventions in the operating theater or cath lab more than one time so they might be more difficult to handle due to their prior experience. They even sometimes refuse to swallow the premed and that has led us to compare an alternative route of administration, the sublingual, that requires less cooperation from the child. Even though premedication of pediatric patients with midazolam is a standard procedure in our hospital, we are aware and alert in case of possible risks such as respiratory depression, oversedation or cardiovascular effects, especially in the vulnerable pediatric cardiac population.

### Where is the study run from?

Onassis Hospital (Greece)

When is the study starting and how long is it expected to run for?  
July 2021 to October 2022

Who is funding the study?  
Alexander S. Onassis Public Benefit Foundation (Greece)

Who is the main contact?  
Theofili Kousi, t.kousi@onasseio.gr

## Contact information

### Type(s)

Principal investigator, Scientific, Public

### Contact name

Mrs Theofili Kousi

### ORCID ID

<https://orcid.org/0000-0001-6515-1836>

### Contact details

Leoforos Syngrou 356, Kallithea  
Athens  
Greece  
17674  
+30 (0)6944635346  
t.kousi@onasseio.gr

## Additional identifiers

## Study information

### Scientific Title

Oral versus sublingual midazolam premedication in pediatric cardiac population: pharmacokinetic, hemodynamic, and behavioral outcomes

### Study objectives

Dose- and age-adjusted pharmacokinetic models; age- and weight-adjusted hemodynamic models; Fisher exact tests for behavioral outcomes.

### Ethics approval required

Ethics approval required

### Ethics approval(s)

approved 05/03/2021, Ethics Committee Onassis Cardiac Surgery Center (Onasseio Nosokomeio 356 Leoforos Syngrou, Athens, 17674, Greece; +30 (0)2109493374; a.gkouvelou@onasseio.gr), ref: B.03. Π.Ε.Ε 709 (ΙΩ Γ 010) / 25.02.2021

### Primary study design

Interventional

### **Allocation**

Randomized controlled trial

### **Masking**

Blinded (masking used)

### **Control**

Uncontrolled

### **Assignment**

Parallel

### **Purpose**

Basic science, Treatment

### **Study type(s)**

### **Health condition(s) or problem(s) studied**

Pediatric cardiac surgery or cardiological intervention in the cath lab with general anaesthesia, requiring premedication

### **Interventions**

Children receiving preoperative midazolam as premedication before cardiac surgery or cath lab intervention. Patients were classified according to administration route: oral ( $\Sigma$ ) or sublingual ( $Y$ ). The dataset contained 68 children in total (33 oral and 35 sublingual). Date of birth was used to estimate age in years with 2021 as the study year; age was calculated relative to 01/07/2021 for analytic consistency.

Oral treatment group ( $\Sigma$ ):

Generic drug name: midazolam

Dosage: 0.5 mg/kg

Method: oral route, by mouth

Frequency of administration: once

Total duration and follow-up: 30 minutes

sublingual treatment group ( $Y$ )

Generic drug name: midazolam

Dosage: 0.3 mg/kg

Method: sublingual, under the tongue

Frequency of administration: once

Total duration and follow-up: 30 minutes

Randomisation process: computer-generated random numbers

### **Intervention Type**

Drug

### **Phase**

Phase III/IV

**Drug/device/biological/vaccine name(s)**

Midazolam

**Primary outcome(s)**

1. Pharmacokinetics measured using plasma midazolam and 1-hydroxymidazolam concentrations at 30 min after drug administration
2. Safety measured using blood pressure, heart rate, and SpO<sub>2</sub> (BP values were recorded either as systolic/diastolic/MAP or as systolic/diastolic only; when MAP was not explicitly recorded, MAP was calculated as  $DBP + (SBP - DBP) / 3$ ) at baseline, 15 minutes, and 30 minutes after drug administration
3. Sedation measured using sedation score coded as follows: A = anxious, B = restless,  $\Gamma$  = calm and awake,  $\Delta$  = sedated but easily woken, and E = deeply sedated. Positive outcomes for these two variables were predefined as  $\Gamma$  or  $\Delta$  at 15 and 30 minutes after drug administration
4. Separation from parents measured using score coded as A = easy, B = mild resistance, and  $\Gamma$  = strong resistance; positive outcomes for these variables were predefined as A at 30 minutes after drug administration
5. Mask acceptance measured using score coded as A = easy, B = mild resistance, and  $\Gamma$  = strong resistance; positive outcomes for these variables were predefined as A at 30 minutes after drug administration

**Key secondary outcome(s)****Completion date**

03/10/2022

**Eligibility****Key inclusion criteria**

1. Pediatric congenital population
2. Programmed intervention in operation theater or cath lab
3. General anaesthesia required

**Healthy volunteers allowed**

No

**Age group**

Child

**Lower age limit**

6 months

**Upper age limit**

8 years

**Sex**

All

**Total final enrolment**

65

**Key exclusion criteria**

1. Age below 6 months
2. Weight below 5 kg
3. Weight above 40 kg

**Date of first enrolment**

14/07/2021

**Date of final enrolment**

02/10/2022

**Locations****Countries of recruitment**

Greece

**Sponsor information****Organisation**

Onassis Hospital

**ROR**

<https://ror.org/02a7ga636>

**Funder(s)****Funder type****Funder Name**

Alexander S. Onassis Public Benefit Foundation

**Alternative Name(s)**

Onassis Foundation, Alexander S. Onassis Foundation, Fondation Onassis, Public Benefit Foundation, A. Onassis, Public Benefit Foundation

**Funding Body Type**

Private sector organisation

**Funding Body Subtype**

Trusts, charities, foundations (both public and private)

**Location**

Liechtenstein

**Results and Publications**

**Individual participant data (IPD) sharing plan**

**IPD sharing plan summary**

Not expected to be made available