



## Clinical trial results: Highdose Steroid for High Pain Responders undergoing Total Hip-arthroplasty - A randomized doubleblindet controlled trial.

### Summary

EudraCT number	2018-002636-25
Trial protocol	DK
Global end of trial date	01 March 2021

### Results information

Result version number	v1 (current)
This version publication date	26 September 2022
First version publication date	26 September 2022

### Trial information

#### Trial identification

Sponsor protocol code	NBF_HK_03_2018
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#### Additional study identifiers

ISRCTN number	-
ClinicalTrials.gov id (NCT number)	NCT03763760
WHO universal trial number (UTN)	-

Notes:

#### Sponsors

Sponsor organisation name	Anesthesia-research group of Prof. Nicolai Bang Foss
Sponsor organisation address	Kettegård alle 30, Hvidovre , Denmark, 2650
Public contact	Research group, Anaesthesia Department, Hvidovre Hospital, Capital Region of Denmark., +45 38623862, Niklas.Ingemann.Nielsen@regionh.dk
Scientific contact	Research group, Anaesthesia Department, Hvidovre Hospital, Capital Region of Denmark., +45 38623862, Niklas.Ingemann.Nielsen@regionh.dk

Notes:

#### Paediatric regulatory details

Is trial part of an agreed paediatric investigation plan (PIP)	No
Does article 45 of REGULATION (EC) No 1901/2006 apply to this trial?	No
Does article 46 of REGULATION (EC) No 1901/2006 apply to this trial?	No

Notes:

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**Results analysis stage**

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Analysis stage	Final
Date of interim/final analysis	10 November 2020
Is this the analysis of the primary completion data?	Yes
Primary completion date	10 November 2020
Global end of trial reached?	Yes
Global end of trial date	01 March 2021
Was the trial ended prematurely?	No

Notes:

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**General information about the trial**

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Main objective of the trial:

To investigate the effect of high dose steroids on the amount of patients with VAS >30 in a 5-meter walktest, 24 hours postoperatively after total hip-arthroplasty in a High Pain responder cohort.

Protection of trial subjects:

All patients had standardized care, surgery and treatments as part of a Fast-track surgery regimen in Total Hip Arthroplasty surgery, and both study-treatment-groups had active treatment (standard-dose vs. higher dose).

Background therapy:

Multimodal opioid-sparing analgesia including Cox-2 inhibitors, acetaminophen(paracetamol) and rescue opioids (morphine or oxycodone).

All patients had pre- and postoperative tranexamic acid.

Thromboprophylaxis was used in-hospital only (xarelto or eliquis).

All patients had neuraxial anesthesia with bupivacaine.

Evidence for comparator:

The use of steroids as a perioperative mean of reducing postoperative stress and hence reducing postoperative pain is well-known, and several articles exist on the topic.

Lunn TH, Andersen LO, Kristensen BB, Husted H, Gaarn-Larsen L, Bandholm T, Ladelund S, Kehlet H: Effect of high-dose preoperative methylprednisolone on recovery after total hip arthroplasty: A randomized, double-blind, placebo-controlled trial.

Br J Anaesth 2013; 110:66-73

De Oliveira GS, Almeida MD, Benzon HT, McCarthy RJ.

Perioperative single dose systemic dexamethasone for postoperative pain: A meta-analysis of randomized controlled trials.

Anesthesiology 2011; 115: 575-88

C.C. Jørgensen, F.T. Pitter, H. Kehlet

Safety aspects of preoperative high-dose glucocorticoid in primary total knee replacement

Br J Anaesth, 119 (2017), pp. 267-275

A. Toner, V. Ganeshanathan, M. Chan, K. Ho, T. Corcoran

Safety of perioperative glucocorticoids in elective noncardiac surgery, a systematic review and metaanalysis

Anesthesiology, 126 (2017), pp. 234-248

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Actual start date of recruitment	03 December 2018
Long term follow-up planned	No
Independent data monitoring committee (IDMC) involvement?	Yes

Notes:

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**Population of trial subjects**

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**Subjects enrolled per country**

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Country: Number of subjects enrolled	Denmark: 160
Worldwide total number of subjects	160
EEA total number of subjects	160

Notes:

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**Subjects enrolled per age group**

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In utero	0
Preterm newborn - gestational age < 37 wk	0
Newborns (0-27 days)	0
Infants and toddlers (28 days-23 months)	0
Children (2-11 years)	0
Adolescents (12-17 years)	0
Adults (18-64 years)	47
From 65 to 84 years	109
85 years and over	4

## Subject disposition

### Recruitment

Recruitment details:

Patients were recruited before surgery at their information meeting. All participants had had oral and written project information in accordance with guidelines and had at least 24 hours of consideration. All participants gave informed consent. Patients were screened at Hvidovre Hospital and Vejle sygehus from January 2019 to July 2020.

### Pre-assignment

Screening details:

From January 29, 2019, to July 16, 2020, a total of 1247 patients planned for hip arthroplasty were assessed for inclusion in accordance with inclusion and exclusion criteria. 25% of screened patients were eligible and 160 patients were included and randomized.

### Period 1

Period 1 title	Overall trial (overall period)
Is this the baseline period?	Yes
Allocation method	Randomised - controlled
Blinding used	Double blind
Roles blinded	Subject, Investigator, Monitor, Data analyst, Carer, Assessor

Blinding implementation details:

Randomization sequence were made by unblinded physicians not otherwise connected to the study or the participants with double-control.  
Study-specific trained unblinded nurses at each site, not having any contact with the participants were responsible for preparing the study drug and blinding this for all other personnel.  
Study-drug was mixed into a blinded 100 ml. container, and intervention and control were alike in both volume and appearance.

### Arms

Are arms mutually exclusive?	Yes
<b>Arm title</b>	Intervention (High dose, HD)

Arm description:

Intervention arm, High dose Dexamethasone 1mg/kg of patient's actual bodyweight.

Arm type	Experimental
Investigational medicinal product name	Dexamethasone
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Infusion
Routes of administration	Intravenous drip use

Dosage and administration details:

Dexamethasone 10mg/ml, added to a 100 ml. NaCl container in accordance with the patient's actual weight, thus the intervention dose was 1mg/kg.  
Infusion initiated after application of neuraxial anesthesia and administered within 10-15 minutes.

<b>Arm title</b>	Control (standard/intermediate dose (ID))
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Arm description:

Intermediate dose dexamethasone 0.3mg/kg of actual bodyweight

Arm type	Active comparator
Investigational medicinal product name	Dexamethasone
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Infusion
Routes of administration	Intravenous drip use

Dosage and administration details:

Dexamethasone 10mg/ml, added to a 100 ml. NaCl container in accordance to the patient's actual

weight, thus the intervention dose was 0.3mg/kg.

Infusion initiated after application of neuraxial anesthesia and administered within 10-15 minutes.

<b>Number of subjects in period 1</b>	Intervention (High dose, HD)	Control (standard/intermediate dose (ID))
Started	80	80
Completed	75	75
Not completed	5	5
Consent withdrawn by subject	-	1
Revision surgery before 24h	-	1
excluded due to change of surgery/anesthesia	5	3

## Baseline characteristics

### Reporting groups

Reporting group title	Intervention (High dose, HD)
Reporting group description: Intervention arm, High dose Dexamethasone 1mg/kg of patient's actual bodyweight.	
Reporting group title	Control (standard/intermediate dose (ID))
Reporting group description: Intermediate dose dexamethasone 0.3mg/kg of actual bodyweight	

Reporting group values	Intervention (High dose, HD)	Control (standard/intermediate dose (ID))	Total
Number of subjects	80	80	160
Age categorical			
Units: Subjects			
In utero			0
Preterm newborn infants (gestational age < 37 wks)			0
Newborns (0-27 days)			0
Infants and toddlers (28 days-23 months)			0
Children (2-11 years)			0
Adolescents (12-17 years)			0
Adults (18-64 years)			0
From 65-84 years			0
85 years and over			0
Age continuous			
Age			
Units: years			
median	71	69	
inter-quartile range (Q1-Q3)	66 to 76	60 to 75	-
Gender categorical			
sex (n/n)			
Units: Subjects			
Female	33	24	57
Male	47	56	103
ASA-score			
ASA-score	American Society of Anesthesiologist score of morbidity and physical status. Range I-VI (1-6) ranging from I: Healthy patient to VI: Brain-dead patient awaiting organ-donation.		
Units: Subjects			
Score I	14	15	29
Score II	51	54	105
Score III	15	11	26
DASI score			
Duke activity status index score, an index to characterize physical performance before surgery			
Units: score			
median	24	24	
inter-quartile range (Q1-Q3)	15 to 35	15 to 31	-
Bodymass index			

Units: kg/m <sup>2</sup>			
median	30	28	
inter-quartile range (Q1-Q3)	26 to 32	25 to 33	-

## End points

### End points reporting groups

Reporting group title	Intervention (High dose, HD)
Reporting group description: Intervention arm, High dose Dexamethasone 1mg/kg of patient's actual bodyweight.	
Reporting group title	Control (standard/intermediate dose (ID))
Reporting group description: Intermediate dose dexamethasone 0.3mg/kg of actual bodyweight	

### Primary: Primary Outcome: Percentage of patients experiencing VAS>30mm on a 0-100 mm. VAS scale 24 hours after surgery upon ambulation

End point title	Primary Outcome: Percentage of patients experiencing VAS>30mm on a 0-100 mm. VAS scale 24 hours after surgery upon ambulation
End point description: Percentage of patients experiencing VAS>30mm on a 0-100 mm VAS scale 24 hours after surgery upon ambulation in a 5 meter walk test.	
End point type	Primary
End point timeframe: 24 hours after knee replacement surgery (a timeframe of 1 hour before and after precise timepoint of end of surgery).	

End point values	Intervention (High dose, HD)	Control (standard/intermediate dose (ID))		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	75 <sup>[1]</sup>	75 <sup>[2]</sup>		
Units: percentage				
VAS>30	33	32		
VAS<31	42	44		

Notes:

[1] - 5 patients excluded before analysis

[2] - 5 patients excluded before analysis

### Statistical analyses

Statistical analysis title	Significance test
Statistical analysis description: Chi-squared test	
Comparison groups	Intervention (High dose, HD) v Control (standard/intermediate dose (ID))

Number of subjects included in analysis	150
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.814
Method	Chi-squared

### Secondary: PAIN (VAS-score) 24hours after surgery upon ambulation

End point title	PAIN (VAS-score) 24hours after surgery upon ambulation
End point description:	VAS-score upon ambulation in a 0-100mm. VAS scale upon a 5 meter walk test 24 hours after surgery.
End point type	Secondary
End point timeframe:	24 hours after surgery (prespecified timeframe of 1 hour before and after actual end of surgery timepoint).

End point values	Intervention (High dose, HD)	Control (standard/intermediate dose (ID))		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	75	75		
Units: mm				
median (inter-quartile range (Q1-Q3))				
Vas-score	29 (13 to 47.5)	24 (9 to 45.5)		

### Statistical analyses

Statistical analysis title	significance test
Comparison groups	Intervention (High dose, HD) v Control (standard/intermediate dose (ID))
Number of subjects included in analysis	150
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.459
Method	Wilcoxon (Mann-Whitney)

### Secondary: VAS>30mm 24hours after surgery upon rest

End point title	VAS>30mm 24hours after surgery upon rest
End point description:	Percentage of patients experiencing VAS>30mm upon rest in a 0-100mm. VAS scale 24 hours after surgery.
End point type	Secondary

End point timeframe:

24 hours after surgery (prespecified timeframe of 1 hour before and after actual end of surgery timepoint).

<b>End point values</b>	Intervention (High dose, HD)	Control (standard/inter mediate dose (ID)		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	75	75		
Units: (n/n, %)				
VAS >30	23	18		
VAS<31	52	58		

### Statistical analyses

No statistical analyses for this end point

### Secondary: Cumulated pain day 0-2 upon rest

End point title | Cumulated pain day 0-2 upon rest

End point description:

Cumulated pain scores (VAS 0-100mm) on day 0-2, median(IQR)

End point type | Secondary

End point timeframe:

0-48 hours after surgery (prespecified timeframe of 1 hour before and after actual end of surgery timepoint).

<b>End point values</b>	Intervention (High dose, HD)	Control (standard/inter mediate dose (ID)		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	75	75		
Units: mm				
median (inter-quartile range (Q1-Q3))				
Cumulated pain	50 (19 to 91)	40 (23 to 81)		

### Statistical analyses

No statistical analyses for this end point

### Secondary: Cumulated pain day 0-2 upon ambulation

End point title | Cumulated pain day 0-2 upon ambulation

End point description:

Cumulated pain scores (VAS 0-100mm) on day 0-2, median(IQR) upon ambulation in a 5m walk test

End point type Secondary

End point timeframe:

0-48 hours after surgery (prespecified timeframe of 1 hour before and after actual end of surgery timepoint).

<b>End point values</b>	Intervention (High dose, HD)	Control (standard/inter mediate dose (ID)		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	75	75		
Units: mm				
median (inter-quartile range (Q1-Q3))				
cumulated pain day 0-2 upon ambulation	60 (26 to 95)	52 (21 to 94)		

### Statistical analyses

No statistical analyses for this end point

### Secondary: Cumulated pain day 0-2 upon passive leg raise

End point title Cumulated pain day 0-2 upon passive leg raise

End point description:

Cumulated pain scores (VAS 0-100mm) on day 0-2, median(IQR)

End point type Secondary

End point timeframe:

0-48 hours after surgery (prespecified timeframe of 1 hour before and after actual end of surgery timepoint).

<b>End point values</b>	Intervention (High dose, HD)	Control (standard/inter mediate dose (ID)		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	75	75		
Units: vas (mm)				
median (inter-quartile range (Q1-Q3))				
Cumulated pain day 0-2 upon passive leg raise	31 (0 to 85)	14 (0 to 54)		

### Statistical analyses

No statistical analyses for this end point

### Secondary: Cumulated pain day 0-2 during nights

End point title | Cumulated pain day 0-2 during nights

End point description:

Cumulated pain scores (VAS 0-100mm) on day 0-2, median(IQR)

End point type | Secondary

End point timeframe:

0-48 hours after surgery (prespecified timeframe of 1 hour before and after actual end of surgery timepoint).

End point values	Intervention (High dose, HD)	Control (standard/inter mediate dose (ID)		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	75	75		
Units: VAS (mm)				
median (inter-quartile range (Q1-Q3))				
Cumulated pain day 0-2 during nights	49 (16 to 92)	63 (33 to 90)		

### Statistical analyses

No statistical analyses for this end point

### Secondary: CRP after surgery

End point title | CRP after surgery

End point description:

C-reactive protein (CRP) as a measure of inflammatory response (mg/L)

End point type | Secondary

End point timeframe:

24 and 48 hour after surgery

End point values	Intervention (High dose, HD)	Control (standard/inter mediate dose (ID)		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	75	75		
Units: mg/L				
median (inter-quartile range (Q1-Q3))				
CRP 24 hours	25 (13 to 37)	19 (12 to 31)		
CRP 48 hours	22 (12 to 42)	28 (18 to 41)		

## Statistical analyses

No statistical analyses for this end point

### Secondary: Cumulated opioid-use day 0-2

End point title Cumulated opioid-use day 0-2

End point description:

Cumulated opioid-use presented as oral morphine in mg., cumulated day 0-2.

End point type Secondary

End point timeframe:

Postoperative day 0-2 reported at timepoints 24h and 48h after surgery

End point values	Intervention (High dose, HD)	Control (standard/inter mediate dose (ID)		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	75	75		
Units: mg of oral morphine				
median (inter-quartile range (Q1-Q3))				
Day 0-2	30 (15 to 60)	38 (18 to 64)		

## Statistical analyses

No statistical analyses for this end point

### Secondary: Cumulated opioid-use day 2-7

End point title Cumulated opioid-use day 2-7

End point description:

Cumulated opioid-use presented as oral morphine in mg., cumulated day 2-7.

End point type Secondary

End point timeframe:

Postoperative day 2-7 reported at timepoints from evening day 2 and onto evening day 7 after surgery

<b>End point values</b>	Intervention (High dose, HD)	Control (standard/inter mediate dose (ID)		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	71	74		
Units: mg				
median (inter-quartile range (Q1-Q3))				
Day 2-7	30 (0 to 110)	20 (0 to 68)		

### **Statistical analyses**

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No statistical analyses for this end point

## Adverse events

### Adverse events information<sup>[1]</sup>

Timeframe for reporting adverse events:

Serious adverse events were reported on day 0, 1, 2, 7, 30 or 90, or when alerted via our electronic patient record-system, and all SAE were reported within 24h of alert to the Sponsor.

Adverse event reporting additional description:

Only Serious adverse events were recorded and reported in accordance with the approval of the Danish medicines agency and local ethics committee, as Dexamethasone is a broadly used and well-approved drug.

If adverse events (not serious adverse events) were reported or suspected of occurring in more than 5% of patients, the sponsor was informed.

Assessment type	Systematic
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### Dictionary used

Dictionary name	MedDRA
Dictionary version	10.0

### Reporting groups

Reporting group title	Intervention (High dose, HD)
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Reporting group description:

Intervention arm, High dose Dexamethasone 1mg/kg of patient's actual bodyweight.

Reporting group title	Control (standard/intermediate dose (ID))
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Reporting group description:

Intermediate dose dexamethasone 0.3mg/kg of actual bodyweight

Notes:

[1] - There are no non-serious adverse events recorded for these results. It is expected that there will be at least one non-serious adverse event reported.

Justification: No non-serious adverse events were recorded, as accepted in the protocol by the local ethics committee and the Danish authorities (DKMA).

Serious adverse events	Intervention (High dose, HD)	Control (standard/intermediate dose (ID))	
Total subjects affected by serious adverse events			
subjects affected / exposed	7 / 75 (9.33%)	7 / 75 (9.33%)	
number of deaths (all causes)	0	0	
number of deaths resulting from adverse events	0	0	
Surgical and medical procedures			
Need of additional surgery	Additional description: hip dislocation, fractures and soft-tissue debridement		
subjects affected / exposed	4 / 75 (5.33%)	3 / 75 (4.00%)	
occurrences causally related to treatment / all	0 / 4	0 / 3	
deaths causally related to treatment / all	0 / 0	0 / 0	
Cardiac disorders			
Fluid imbalance	Additional description: Pulmonary edema due to fluid imbalance within 90 days of surgery		
subjects affected / exposed	0 / 75 (0.00%)	2 / 75 (2.67%)	
occurrences causally related to treatment / all	0 / 0	0 / 2	
deaths causally related to treatment / all	0 / 0	0 / 0	
Deep vein thrombosis	Additional description: Suspected DVT without positive findings		

subjects affected / exposed	0 / 75 (0.00%)	1 / 75 (1.33%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	
Nervous system disorders			
Myasthenia gravis	Additional description: 1 patient presented with onset of myasthenia gravis within 90 days after surgery.		
subjects affected / exposed	1 / 75 (1.33%)	0 / 75 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Gastrointestinal disorders			
Cholecystitis			
subjects affected / exposed	1 / 75 (1.33%)	0 / 75 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Respiratory, thoracic and mediastinal disorders			
Asthma	Additional description: Admission due to decline in known asthma.		
subjects affected / exposed	1 / 75 (1.33%)	0 / 75 (0.00%)	
occurrences causally related to treatment / all	0 / 1	0 / 0	
deaths causally related to treatment / all	0 / 0	0 / 0	
Infections and infestations			
Urinary tract infection			
subjects affected / exposed	0 / 75 (0.00%)	1 / 75 (1.33%)	
occurrences causally related to treatment / all	0 / 0	0 / 1	
deaths causally related to treatment / all	0 / 0	0 / 0	

Frequency threshold for reporting non-serious adverse events: 5 %

<b>Non-serious adverse events</b>	Intervention (High dose, HD)	Control (standard/intermediate dose (ID))	
Total subjects affected by non-serious adverse events			
subjects affected / exposed	0 / 75 (0.00%)	0 / 75 (0.00%)	

## More information

### Substantial protocol amendments (globally)

Were there any global substantial amendments to the protocol? No

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### Interruptions (globally)

Were there any global interruptions to the trial? Yes

Date	Interruption	Restart date
17 March 2020	Elective surgery was shut down due to the global Covid crisis.	02 June 2020

Notes:

### Limitations and caveats

None reported