Introduction
The patient’s ability to complete their planned physiotherapy session after hip fracture surgery has been proposed as an independent predictor for achieving basic mobility independency upon hospital discharge. However, knowledge of factors limiting early physiotherapy and ambulation following hip fracture surgery is sparse, especially in patients that are demented and or residing in nursing homes. The aim, therefore, was to examine patient reported factors limiting ability to complete planned physiotherapy sessions as well as limitations for not achieving independency in basic mobility early after hip fracture surgery in an unselected cohort.

Method
204 consecutive patients (142 women) with a hip fracture (mean (SD) age of 80 (9.9) years, 47 patients of which were admitted from a nursing home). 115 patients had a low pre-fracture functional level (New Mobility Score of 0-6 points), 69 a low cognitive status, 87 a poor health status (ASA-score 3-4), and 111 a proximal femoral fracture. All patients were treated in accordance with a multimodal enhanced program. The Cumulated Ambulation Score (CAS) was used to evaluate the patient’s independency in three basic mobility activities. Limitations for patients not achieving a full CAS score or inability to complete their planned physiotherapy sessions were noted by physiotherapists on postoperative day 1-3.

Results
Fatigue and hip fracture-related pain were the most frequent reasons for patients not achieving independent basic mobility level (> 85% of patients) or not fully completing their planned physiotherapy (> 42% of patients) on all three days (Figure 1 A-B). Fatigue was not associated with any of the patient characteristics, while hip fracture-related pain more often was seen as a limitation in patients with a trochanteric fracture and a high cognitive status. At hospital discharge (median [IQR] day 10 [6-14]), only 54% of patients had regained their pre-fracture basic mobility level.

Discussion
The use of CAS for the evaluation of basic mobility is both valid and reliable and the score can be applied in all patients, regardless of physical and cognitive status. Our study included patients from nursing homes and with low pre-fracture function representing the everyday clinical life. Pain and fatigue cannot be well-reported by patients with lower cognitive status and therefore the impact of these factors could be underrepresented in our study, highlighting the importance of interventions that attenuate these factors.

Conclusions
Based on the patient’s perception, fatigue and pain are the most frequent limitations for patients not achieving independent basic mobility and not completing physiotherapy, early after hip fracture surgery, despite following an enhanced recovery program. This raises questions whether multimodal perioperative hip fracture programs can be further optimized to enhance the early recovery of these frail patients.
Abstract P

Korresponderende forfatter  
Kristian Dahl Friesgaard

Email  
k.friesgaard@me.com

Afdeling  
Forskningsafdelingen

Hospital/institution  
Præhospitalet Region Midtjylland

Medforfattere  
Erika F. Christensen, Hans Kirkegaard, Mette Dahl Bendtsen, Lone Nikolajsen

Titel  
Prehospital analgesic treatment of patients with hip fracture

Introduction

Patients with hip fracture represent a large and prone patient group frequently transported by ambulance. Efficient analgesia in the prehospital setting is considered important to reduce physical and emotional stress and to facilitate transportation and diagnostic manoeuvres. Nevertheless, prehospital studies report that acute pain among these patients is undertreated. Predictors for non-treatment in the prehospital environment are scarcely explored. The aim of this study is to explore the prevalence of intravenous fentanyl treatment of patients with hip fracture in Northern Denmark Region and to explore predictors for non-treatment.

Methods

This is a register based observational closed cohort study with patients suffering from femoral neck fractures in Northern Denmark Region in the 3-year study period from July 1st 2011 to June 30st 2014. The patient cohort is identified via the Danish Multidisciplinary Hip Fracture Registry, which contains data on patient characteristics such as type of fracture, Charlson Comorbidity Index score and vital status. Data have been merged with prehospital ambulance data from an electronic source (Amphi®). The primary outcome is prehospital fentanyl treatment (yes/no) and predictors for non-treatment is investigated by terms of multivariate logistic regression.
Results
2140 out of 2394 patients with hip fracture could be identified in Amphi®. Mean age was 83.2 (95% CI 82.9-83.6), 30.5% (95% CI 28.5-32.5) were male and 30-day mortality was 12.3 (95% CI 11.0-13.8). Only 27.3% (95% CI 25.4-29.2) were treated with fentanyl. Predictors for non-treatment were high age, male gender, housing (institution), type of fracture (medial), little time with ambulance personnel, low triage level and if seen by general practitioner prior to transport (table).

Discussion
The strength of this study is the large sample size identified in the Danish Multidisciplinary Hip Fracture Registry. The limitations should be seen in the light of its observational design and the risk of residual confounding.

Conclusion
Few patients with hip fracture are treated with intravenous fentanyl and assessable covariates such as age, sex, type of fracture, housing, time and triage level are associated with prehospital non-treatment. Education of ambulance personnel is needed in order to optimize assessment and treatment of these vulnerable patients. Also, a worthwhile discussion is whether alternative/supportive prehospital pain treatment modalities should be introduced; a treatment with adequate analgesic properties and side-effects that can be handled satisfactorily by ambulance personnel. Future research should also explore residual confounders, e.g. ambulance personnel and patient-related factors such as attitudes towards pain management and fear of opioid induced side-effects.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>n=2140</th>
<th>Fentanyl administered, % (95% CI)</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 74</td>
<td>362</td>
<td>34.3 (29.3-39.2)</td>
<td>1 (reference)</td>
</tr>
<tr>
<td>75-79</td>
<td>338</td>
<td>30.8 (25.8-35.7)</td>
<td>0.85 (0.62-1.17)</td>
</tr>
<tr>
<td>80-84</td>
<td>465</td>
<td>26.5 (22.4-30.5)</td>
<td>0.71 (0.51-0.93)</td>
</tr>
<tr>
<td>≥ 90</td>
<td>448</td>
<td>23.7 (19.7-27.6)</td>
<td>0.59 (0.44-0.81)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1488</td>
<td>29.0 (26.7-31.3)</td>
<td>1 (reference)</td>
</tr>
<tr>
<td>Male</td>
<td>652</td>
<td>23.3 (20.1-26.6)</td>
<td>0.74 (0.60-0.92)</td>
</tr>
<tr>
<td>CCI score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>875</td>
<td>30.9 (27.8-33.9)</td>
<td>1 (reference)</td>
</tr>
<tr>
<td>1</td>
<td>528</td>
<td>23.5 (19.9-27.1)</td>
<td>0.69 (0.54-0.88)</td>
</tr>
<tr>
<td>≥ 2</td>
<td>340</td>
<td>25.0 (20.4-29.6)</td>
<td>0.75 (0.56-0.99)</td>
</tr>
<tr>
<td>≥ 3</td>
<td>397</td>
<td>26.4 (22.1-30.8)</td>
<td>0.81 (0.62-1.05)</td>
</tr>
<tr>
<td>Housing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own home</td>
<td>1328</td>
<td>30.5 (28.0-33.0)</td>
<td>1 (reference)</td>
</tr>
<tr>
<td>OHATI</td>
<td>210</td>
<td>34.8 (28.3-41.3)</td>
<td>1.21 (0.89-1.65)</td>
</tr>
<tr>
<td>Institution</td>
<td>429</td>
<td>14.0 (10.7-17.3)</td>
<td>0.37 (0.27-0.50)</td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>191</td>
<td>26.7 (20.4-33.0)</td>
<td>0.98 (0.69-1.39)</td>
</tr>
<tr>
<td>Normal</td>
<td>1051</td>
<td>27.9 (24.3-30.7)</td>
<td>1 (reference)</td>
</tr>
<tr>
<td>Overweight</td>
<td>521</td>
<td>27.8 (24.0-31.7)</td>
<td>1.04 (0.82-1.31)</td>
</tr>
<tr>
<td>Obese</td>
<td>377</td>
<td>27.6 (23.1-32.1)</td>
<td>1.03 (0.79-1.34)</td>
</tr>
<tr>
<td>Type of fracture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displaced</td>
<td>230</td>
<td>23.0 (17.6-28.5)</td>
<td>1 (reference)</td>
</tr>
<tr>
<td>Undisplaced</td>
<td>1717</td>
<td>27.5 (25.4-29.7)</td>
<td>0.79 (0.60-1.09)</td>
</tr>
<tr>
<td>Unspecified</td>
<td>34</td>
<td>38.2 (31.0-55.4)</td>
<td>1.63 (0.81-3.28)</td>
</tr>
<tr>
<td>Subtrochanteric</td>
<td>182</td>
<td>39.0 (31.9-46.2)</td>
<td>1 (reference)</td>
</tr>
<tr>
<td>Ptertrochanteric</td>
<td>872</td>
<td>29.5 (26.4-32.5)</td>
<td>0.65 (0.47-0.91)</td>
</tr>
<tr>
<td>Medial</td>
<td>1606</td>
<td>23.6 (21.8-25.1)</td>
<td>0.40 (0.35-0.67)</td>
</tr>
<tr>
<td>Prior consultation with GP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1622</td>
<td>30.4 (28.2-32.6)</td>
<td>1 (reference)</td>
</tr>
<tr>
<td>Yes</td>
<td>518</td>
<td>17.6 (14.3-20.9)</td>
<td>0.49 (0.38-0.63)</td>
</tr>
<tr>
<td>EMCC triage level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A (highest)</td>
<td>145</td>
<td>37.9 (29.9-45.9)</td>
<td>1 (reference)</td>
</tr>
<tr>
<td>B</td>
<td>1246</td>
<td>32.9 (30.3-35.5)</td>
<td>0.80 (0.56-1.15)</td>
</tr>
<tr>
<td>C</td>
<td>504</td>
<td>11.1 (8.4-13.9)</td>
<td>0.20 (0.13-0.31)</td>
</tr>
<tr>
<td>Time with ambulance personnel, minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 20</td>
<td>174</td>
<td>1.7 (0.9-3.7)</td>
<td>0.02 (0.01-0.06)</td>
</tr>
<tr>
<td>20-29</td>
<td>306</td>
<td>12.4 (7.0-16.1)</td>
<td>0.15 (0.10-0.22)</td>
</tr>
<tr>
<td>30-39</td>
<td>362</td>
<td>21.9 (16.8-25.2)</td>
<td>0.28 (0.20-0.39)</td>
</tr>
<tr>
<td>40-49</td>
<td>377</td>
<td>30.0 (25.3-34.6)</td>
<td>0.44 (0.33-0.61)</td>
</tr>
<tr>
<td>≥ 60</td>
<td>337</td>
<td>38.0 (32.8-43.2)</td>
<td>0.64 (0.47-0.87)</td>
</tr>
<tr>
<td>25-29.9 (overweight) and ≥ 30.0 (obese)</td>
<td>322</td>
<td>49.1 (43.6-54.6)</td>
<td>1 (reference)</td>
</tr>
</tbody>
</table>

CCI, Charlson Comorbidity Index; OHATI, own home affiliated to an institution; BMI, Body Mass Index; GP, general practitioner; EMCC, Emergency Medical Communication Center.
§ Four levels of body mass index were defined as < 18.5 (underweight), 18.5-24.9 (normal weight), 25-29.9 (overweight) and ≥ 30.0 (obese)
¶ Defined as the time from ambulance arrival on scene until hospital admission
Abstract 13

Korresponderende forfatter    Christopher G Clemmesen
Email                        cclemmesen@gmail.com
Afdeling                     Anæstesiologisk afdeling
Hospital/institution         Hvidovre Hospital
Medforfattere                Troels Haxholdt Lunn, Morten Tange Kristensen, Henrik Palm, Nicolai Bang Foss
Titel                        Effect of methylprednisolone on postoperative delirium in elderly patients undergoing hip fracture surgery A randomized, double-blind, placebo-controlled study

Introduction
Corticosteroids attenuate the surgical inflammatory response; it also reduces pain and facilitates early recovery in elective surgical procedures. Postoperative delirium (POD) is a frequent and serious complication among elderly patients with hip fractures (HF) and has a multifactorial pathogenesis. Neuroinflammation related to the surgical stress is a potential trigger factor for developing postoperative delirium. However, glucocorticoids have also been shown to have the potential to induce psychosis and delirium. There exist no studies of the impact of glucocorticoids on POD after HF surgery.

We investigated the effects in elderly with HF of preoperative high dose methylprednisolone (MP) compared to placebo within an optimized perioperative program. Our outcomes were incidence of POD, postoperative fatigue, pain and independent mobility and physiotherapy after HF surgery.

Methods
We conducted a double-blind, randomized controlled trial. The study was approved by all relevant Authorities and monitored by the GCP unit at Copenhagen University Hospital. ClinicalTrials.gov NCT02317601. Patients scheduled for acute hip fracture surgery, aged 65 years or older and who could provide written informed consent were randomized (1:1) to methylprednisolone 125 mg iv or placebo (administered as a single dose as soon as possible after admission, confirmed hip fracture and inclusion). The primary endpoint was severity of POD the first three postoperative days measured with the Confusion Assessment Method severity measure (CAM-S). Secondary endpoints were incidence of POD, fatigue and pain after surgery measured by self-assessment on a 5-point VRS, patient independent mobility and physiotherapy measured by Cumulated Ambulation Score (CAS) and inflammatory response measured by biomarkers in the blood. The analytical framework was superiority, and analyses were conducted as per the intention-to-treat principle and were performed blinded.

Results
718 patients with hip fractures were screened. A total of 120 patients were randomly assigned to MP versus placebo preoperatively. Mean age was 79.6(SD 8.5) years, 62 % were female. Thirty-seven percent had an ASA score between 3 and 4. There was no significant difference in distributions of CAM-S score and CAS score between the groups. The patients in the MP group had a significantly lower postoperative cumulated fatigue compared to the placebo group.

Discussion
This study is the first to evaluate the effect of glucocorticoids on POD in HF surgery. The internal validity is assumed to be high, but obviously, the results cannot be extrapolated to other patients groups.

Conclusion: A preoperative single high dose of (MP) compared to placebo seems to be safe, and did not impact on the incidence or severity of POD. Cumulated fatigue was significantly lower in the MP group compared to the placebo. Further studies of the impact on rehabilitation of sequential doses of glucocorticoids are warranted.

Abstract 18

Korresponderende forfatter    Christoffer C Jørgensen
Email                        christoffer.calov.joergensen@regionh.dk
Afdeling                     Enhed for Kirurgisk Patofysiologi
Hospital/institution         Rigshospitalet
Medforfattere                Henrik Kehlet, The Lundbeck Foundation Centre for Fast-track Hip and Knee Replacement Collaborative group
Titel                        Safety of single dose of 125 mg methylprednisolone in total knee arthroplasty, a comparative prospective cohort study

Introduction
Single high-dose glucocorticoid has been found to reduce postoperative pain after total hip and knee arthroplasty (TKA) (1,2). However, there are concerns about safety aspects such as increased postoperative morbidity and prosthetic infections (3).
Methods
This study was based on the Lundbeck Foundation Centre for Fast-track Hip and Knee Replacement Database (LCDB), which prospectively records patient comorbidity. Information on length of stay (LOS) and 90-days follow-up is acquired through the Danish National Patient Registry and medical files. From 2013-2014 preoperative administration of 125 mg of methylprednisolone (MP) was recorded in the LCDB as part of the fast-track protocol in TKA. Contraindications for MP were: glucocorticoid use, insulin dependent diabetes mellitus (IDDM) and gastric ulcer. Comparison was done using data prior to introduction of MP, and excluding patients with IDDM. Results were analyzed using multiple logistic regression and adjusting for potential confounders.

Outcomes were: LOS>4 days, 30 and 90 days surgery-related readmissions, and prosthetic infections at 90-days postoperatively.

Results
Of 1629 elective unilateral TKA, 1363 (83.7%) received high-dose MP. Median LOS was 2 days (interquartile range: 2-3) and 5.9% had a LOS >4 days. Readmissions were 5.6% and 8.0% at 30 and 90 days, respectively. Prosthetic infection occurred in 0.7% and surgery-related mortality was 0.07% at 90 days postoperatively.

In 3255 TKA prior to the use of MP, median LOS was 2 days (interquartile range 2-3) and 9.6% had a LOS of >4 days. Readmissions were 4.7% and 7.5% at 30 and 90 days, respectively. Prosthetic infection occurred in 0.7% and surgery-related mortality was 0.03%.

After adjusting for confounders MP was associated with a reduced risk of LOS>4 days while no association was found between MP and 30 or 90 days readmissions or prosthetic infection. (Table 1)

Discussion
We did not find any association between MP and readmissions in fast-track TKA. The association of MP with decreased risk of LOS>4 days calls for further large-scale safety and dosefinding/multipledose studies. Finally, despite no differences in prosthetic infections, the question of increased long term risk remains unanswered.

Conclusion
A single preoperative dose of 125 mg MP was not associated with increased LOS or readmission, suggesting it is safe in TKA.

References:
(1) Effect of high-dose preoperative methylprednisolone on recovery after total hip arthroplasty: a randomized, double-blind, placebo-controlled trial.
(2) Effect of high-dose preoperative methylprednisolone on pain and recovery after total knee arthroplasty: a randomized, placebo-controlled trial.
(3) Perioperative glucocorticoids in hip and knee surgery - benefit vs. harm? A review of randomized clinical trials.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>LOS&gt;4 days</th>
<th>30-days readmission</th>
<th>90-days readmission</th>
<th>Prosthetic infection*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=373 (8.5%)</td>
<td>n=220 (5.0%)</td>
<td>n=337 (7.7%)</td>
<td>n=40 (0.9%)</td>
</tr>
<tr>
<td>MP</td>
<td>OR:0.61 CI:0.46-0.82</td>
<td>OR:1.23 CI:0.91-1.68</td>
<td>OR:1.08 CI:0.84-1.39</td>
<td>OR:0.93 CI:0.43-2.02</td>
</tr>
<tr>
<td>n:1286</td>
<td>p=0.001</td>
<td>p=0.179</td>
<td>p=0.651</td>
<td>p=0.863</td>
</tr>
</tbody>
</table>

N:4368 (94.6%) due to missing data in individual LCDB items. OR: odds ratio CI: 95% confidence interval. Adjusted for: age, gender, smoking, alcohol >2 units/day, use of walking aids, living alone, anaemia, body mass index, cardiac disease, pulmonary disease, psychiatric disorder and diabetes. *no adjustments due to limited numbers

Abstract 19

Korresponderende forfatter
Viktoria Oline Lindberg-Larsen

Email
viktoria_oline@hotmail.com

Afdeling
Enhed for Kirurgisk Patofysiologi

Hospital/institution
Rigshospitalet

Medforfattere
Sisse R. Ostrowski, Martin Lindberg-Larsen, Marie Louise Rovsing, Pär I. Johansson, Henrik Kehlet

Titel
Preoperative Methylprednisolone reduces Endothelial Damage early after Fast-Track Total Knee Arthroplasty - a randomized, double-blind, placebo-controlled trial
Introduction
The inflammatory stress response due to trauma and critical illness activates complex and interacting pathophysiological pathways including the vascular endothelium. Disruption of the vascular endothelium results in vasoconstriction and tissue edema increasing the risk of complications. Glucocorticoids have shown to preserve the endothelial glycocalyx and hence protect the endothelium in animal studies, as well as to reduce the inflammatory response in clinical studies.

The purpose of the study was to evaluate the efficacy of a single preoperative dose of systemic methylprednisolone (MP) on endothelial damage after fast-track total knee arthroplasty (TKA).

Methods
70 patients undergoing elective unilateral TKA at a single center were randomized (1:1) receiving preoperative MP 125 mg IV (group M) or isotonic saline IV (group C). All procedures were performed under spinal anesthesia without tourniquet, using a standardized, multimodal analgesic regime. The primary outcome was change in plasma Syndecan-1 concentrations, a marker of glycocalyx degradation, between groups from baseline to 24 hours postoperatively. Secondary outcomes were changes in endothelial cell injury, activation and permeability markers (plasma soluble thrombomodulin, SE-selectin, vascular endothelial growth factor (VEGF)), as well as C-reactive protein (CRP) concentrations.

Blood samples were collected at baseline and 2, 6, and 24 hours after surgery, and complete blood samples from 63 patients were available for analyses.

Results
MP reduced Syndecan-1 24 hours postoperatively, though not significantly; group M 8.37 (IQR 7.71-11.25) ng/ml vs. group C 10.60 (IQR 7.71-39.19), p=0.062. MP significantly reduced soluble thrombomodulin; group M 4.93 (IQR 4.09-5.62) ng/ml vs. group C 5.71 (IQR 4.23-6.73) ng/ml, p=0.009. SE-selectin; group M 62.41 (IQR 45.75-78.07) ng/ml vs. group C 72.99 (IQR 50.19-105.13) ng/ml, p=0.001, and VEGF; group M 29.04 (IQR 19.85-43.69) ng/ml vs. group C 56.93 (45.25-70.12) ng/ml, p<0.001, 24 hours postoperatively, respectively. Finally, MP significantly reduced the inflammatory response (CRP) 24 hours postoperatively; group M 33 (IQR 21-50) mg/l vs. group C 72 (IQR 58-92) mg/l, p<0.001.

Discussion
Administration of preoperative MP reduced the postoperative disruption of the vascular endothelium and its glycocalyx, and attenuated the inflammatory response after arthroplasty surgery. Our results might contribute to a strategy reducing complications due to surgery. Since the present study was considered hypothesis-generating and conducted during relatively minor elective surgery, further studies in major surgery settings are needed.

Conclusion
Preoperative systemic administration of MP 125 mg reduces endothelial disruption and damage, and the inflammatory response early after fast-track TKA.

References

Abstract 20

Korrespondende forfatter
Eske Kvanner Aasvang
Email
eske.aas@gmail.com
Afdeling
Section for Surgical Pathophysiology
Hospital/institution
Rigshospitalet
Medforfattere
Henrik Kehlet and the Lundbeck Foundation Centre for Fast-track Hip and Knee Replacement “PACU-study” workgroup
Titel
Safety of post-anesthesia care unit discharge without motor-function assessment after total hip- or knee arthroplasty under spinal anesthesia
The post-anesthesia care unit (PACU) is a specialized and resource demanding hospital unit where admittance, observation and treatments needs to be evidence based to facilitate patient recovery and optimal utilization of resources, without compromising patient safety. The focus on this critical phase in the recovery phase after total hip- or knee arthroplasty (THA/TKA) is sparse, but a large potential for optimization of discharge criteria have been suggested including no need for observation for motor blockade after spinal anesthesia. However, no studies have investigated the safety of such altered discharge criteria. Thus we designed a trial to assess the safety of not assessing motor-function after spinal anesthesia for THA or TKA.

Methods
Adult patients scheduled for spinal anesthesia for THA or TKA were included in a randomized prospective non-inferiority trial. Patients were observed in PACU by standardized discharge criteria except motor-function. At discharge readiness patients were randomized to “no motor-function” vs. “motor-function” observation and discharged accordingly. Any adverse event requiring medical staff contact during the first 24 hours were recorded. Primary outcome was differences in fast-track succes (LOS<5 days and no 30 day-readmission). Secondary analysis included; differences in frequency of 24 hours adverse events, time in PACU, time from spinal anesthesia to adverse events and distribution of adverse events between groups. 2 x 725 patients were required to detect a 5% group difference with 80% power.

Results and Discussion
1511 patients were included and 1376 randomized with 99% follow-up (n=1359) 670 in control vs 689 in intervention group. A succesful fast-track course occurred in 92.2% vs 92.0 % of control vs. intervention respectively, (OR 0.97: 95% CI, 0.65 – 1.44, p= 0.92).
90 patients (7%) had an adverse event during the first 24 hours after PACU discharge predominantly related to pain, circulatory and cerebral circumstances, but without significant differences between groups (6.0% vs 7.5%, p = 0.28). PACU stay was significantly shorter in intervention group (1:45 vs. 0:30 hrs., p < 0.001, figure A).19% of adverse events occurred from 0-6 hours after spinal anesthesia administration, 30% between 6-12 hours and 51% > 12 hours (figure B), without significant differences in type of adverse events (p = 0.68) between groups.

Conclusion(s)
Discharge from after spinal for THA or TKA PACU without motor-function assessment is safe with similar fast-track courses, significantly reduced time in PACU stay, and no increase in 24 hours adverse events. The majority of adverse events occurs > 6 hours post-spinal anesthesia.
Introduction
Focused cardiac ultrasound has potential to help identify reversible causes of cardiac arrest. The interpretation of ultrasonographic findings in patients with spontaneous circulation is often extrapolated to those in cardiac arrest, but there is limited evidence to support this practice.

In patients with spontaneous circulation, severe hypovolemia causes a reduction in right ventricular diameter, which may persist during cardiac arrest. In contrast, hyperkalemia may cause right ventricular dilation by arresting the heart in diastole. Furthermore, animal studies have demonstrated right ventricular dilation when cardiac arrest is caused by ventricular fibrillation (VF).

Aim
To study the right ventricular diameter during resuscitation from cardiac arrest caused by hypovolemia and hyperkalemia when compared to VF as control.

Methods
Thirty pigs were randomized to 7 minutes of cardiac arrest induced by hypovolemia, hyperkalemia, or VF. Animals were then resuscitated in accordance with the European Resuscitation Council 2010 Advanced Life Support guidelines. Cardiac ultrasonographic images were obtained before and during cardiac arrest. The primary endpoint was right ventricular diameter at the third rhythm analysis.

Results
In the hypovolemia group, an initial decrease in right ventricular diameter during induction of cardiac arrest was followed by an abrupt increase with the onset of cardiac arrest. The right ventricular diameter also increased with the onset of cardiac arrest in both the hyperkalemia and VF group (P<0.01 for all) (Figure). At the third rhythm analysis, the right ventricle was dilated in all groups when compared with baseline (P<0.05) - in the hypovolemia group it was 32mm (95%CI 29-35) which was significantly larger than in the VF group at 25mm (95%CI 22-28) (P=0.008). In the hyperkalemia group, RV diameter was 29mm (95%CI:26-32) which was not different from hypovolemia or VF (P=NS).

Conclusion
In a porcine model, the right ventricle is dilated during resuscitation from cardiac arrest caused by hypovolemia, hyperkalemia, and ventricular fibrillation. Thus, right ventricular dilation may be a feature inherent to cardiac arrest, rather than specific to a certain cause. Hence, the relationship between cardiac ultrasonographic findings during cardiac arrest and reversible causes should be further studied and not merely extrapolated from patients with spontaneous circulation.
Abstract 6

Korresponderende forfatter Lars Grønlykke
Email larsgroenlykke@gmail.com
Afdeling Thoraxanæstesiologisk afdeling
Hospital/institution Rigshospitalet
Medfører Henrik Ihremann, Jesper Kjaergaard, André Korshin, Finn Gustafsson, Hans Gustav Thyregod, Lars Søndergaard, Hanne Berg Ravn

Titel Measures of Right Ventricular Function after Transcatheter versus Surgical Aortic Valve Replacement

Objectives
Describe changes in measures of right ventricular (RV) function in patients treated for aortic stenosis using open-chest surgery (SAVR) or transcatheter treatment (TAVR).

Methods
Patients in the Nordic Aortic Valve Intervention (NOTION) trial were randomized 1:1 to TAVR (n=114) or SAVR (n=106). Echocardiography was performed at baseline and three and 12 months post-procedure. Tricuspid annular plane systolic excursion (TAPSE) and right ventricular fractional area change (RVFAC) were used as measures of longitudinal and transverse RV contraction. Left ventricular ejection fraction (LVEF) and LV atrioventricular plane displacement (AVPD) were recorded as measures of LV function. Association to NYHA class was examined.

Results
There were no differences in echocardiographic measurements between TAVR and SAVR at baseline. In the SAVR group TAPSE was reduced after three months (2.4cm±0.5cm vs. 1.6cm±0.4cm; p<0.001), and 12 months (2.4cm±0.5cm vs. 1.7cm±0.4cm; p<0.001). RVFAC was reduced after three months (44%±11% vs. 39%±10%; p<0.05), but recovered at 12 months (43%±10%; n.s.) (Figure 1 and 2). AVPD lateral increased during follow-up (1.4cm±0.3cm vs. 1.6cm±0.4cm and 1.7cm±0.4cm respectively; p<0.01), whereas AVPD medial remained stable (n.s.). In the TAVR group, all echocardiographic measures remained unchanged from baseline to 12 months postoperatively (n.s.). We found no association between echocardiographic changes and NYHA class in either group.

Discussion
This is the first randomized study comparing echocardiographic measures of RV function in low-risk patients after TAVR vs. SAVR. Following open-heart surgery TAPSE and RVFAC were reduced three months post-operatively. RVFAC had partly recovered 12 months post-operatively, whereas TAPSE remained decreased. RV function is at risk of being temporarily compromised due to myocardial stunning during and after cardiac surgery with the use of cardioplegic arrest [1]. Neither measures of LV function nor measures of RV function (TAPSE and RVFAC) were associated to NYHA class in either group. It is likely that the reduction in TAPSE after cardiac surgery observed in the present study does not indicate a haemodynamic reduction in RV global systolic function and therefore does not translate into symptomatic functional changes. RV contraction is a complex composite of longitudinal and transverse contractions and it has previously been shown that the contraction pattern of the RV changes with pericardial opening from predominantly longitudinal to transverse contraction [2, 3].

Conclusions
A reduced TAPSE can be observed for at least 12 months after open-heart aortic valve replacement, which should be kept in mind if the patient is evaluated for other non-cardiac surgery. TAPSE and AVPD lateral differed between TAVR and SAVR at three and 12 months follow-up, but these findings were not related to any changes in NYHA class.

References
Figure 1

Changes in TAPSE

Changes from baseline TAPSE in the SAVR and TAVR groups postoperatively. Presented as delta values and S.E.M.

*Indicate statistical significance between groups (p<0.05)

Figure 2

Changes in RVFAC

Changes from baseline TAPSE in the SAVR and TAVR groups postoperatively. Presented as delta values and S.E.M.

*Indicate statistical significance between groups (p<0.05)