## Title

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## Authors

Pelter, Michele M
Loranger, Denise
Kozik, Teri M
et al.

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# Unplanned Transfer from the Telemetry Unit to the Intensive Care Unit in Hospitalized Patients with Suspected Acute Coronary Syndrome

**Michele M. Pelter, RN, PhD**[1], **Denise Loranger, RN**[2], **Teri M. Kozik, RN, PhD**[3], **Richard Fidler, CRNA, PhD**[1], **Xiao Hu, PhD**[1], and **Mary G. Carey, RN, PhD**[4]

[1]University of California San Francisco, San Francisco, CA

[2]Saint Mary's Hospital, Reno Nevada

[3]St. Joseph's Medical Center, Stockton, CA

[4]Strong Memorial Hospital, Rochester, NY

## Abstract

**Background—**Most patients presenting with suspected acute coronary syndrome (ACS) are admitted to telemetry units. While telemetry is an appropriate level of care, acute complications requiring a higher level of care in the intensive care unit (ICU) occur.

**Purpose—**Among patients admitted to telemetry for suspected ACS, we determine the frequency of unplanned ICU transfer, and examine whether ECG changes indicative of myocardial ischemia, and/or symptoms preceded unplanned transfer.

**Method—**This was a secondary analysis from a study assessing occurrence rates for transient myocardial ischemia (TMI) using a 12-lead Holter. Clinicians were blinded to Holter data as it was used in the context research; off-line analysis was performed post discharge. Hospital telemetry monitoring was maintained as per hospital protocol. TMI was defined as > 1 mm ST-segment ↑ or ↓, in > 1 ECG lead, > 1 minute. Symptoms were assessed by chart review.

**Results—**In 409 patients (64 + 13 years), most were men (60%), Caucasian (93%), and had a history of coronary artery disease (47%). Unplanned transfer to the ICU occurred in 9 (2.2%), was equivalent by gender, and age (no transfer 64 + 13 years vs transfer 67 +11 years). Four patients were transferred following unsuccessful percutaneous coronary intervention (PCI) attempt, four due to recurrent angina, and one due to renal and hepatic failure. Mean time from admission to transfer was 13 + 6 hours, mean time to ECG detected ischemia was 6 + 5 hours, and 8.8 + 5 hours for symptoms prompting transfer. In two patients ECG detected ischemia and acute symptoms prompting transfer were simultaneous. In five patients, ECG detected ischemia was clinically

Corresponding Author: Michele M. Pelter, RN, PhD, Assistant Professor, Director, ECG Monitoring Research Lab, Department of Physiological Nursing, University of California, San Francisco (UCSF), 2 Koret Way, San Francisco, CA. 94143-0610, Office: 415-514-1794, Fax: 415-476-8899.

silent. All patients eventually had symptoms that prompted transfer to the ICU. In all nine patients, there was no documentation or nursing notes regarding bedside ECG monitor changes prior to unplanned transfer. Hospital length of stay was longer in the unplanned transfer group (2 days + 2 versus 6 days + 4; p = 0.018).

**Conclusions—**In patients with suspected ACS, while unplanned transfer from telemetry to ICU is uncommon, it is associated with prolonged hospitalization. Two primary scenarios were identified; (1) following unsuccessful PCI, and (2) recurrent angina. Symptoms prompting unplanned transfer occurred, but happened on average 8.8 hours after hospital admission; whereas ECG detected ischemia preceding unplanned transfer occurred on average 6 hours after hospital admission.

### Keywords

Acute Coronary Syndrome; Unplanned Transfer; Telemetry Unit; ICU; Myocardial Ischemia; Holter; 12-Lead

Patients presenting to the emergency department with symptoms suggestive of acute coronary syndrome (ACS), without ST-segment elevation myocardial infarction (MI), represent a major diagnostic challenge. Each year, nearly 6 million people present to emergency department's with complaints of chest pain, however, the majority will rule out for ACS.[1] The current standard of care for patients presenting with suspected ACS who do not have the following; electrocardiographic (ECG) evidence of myocardial ischemia, recurrent symptoms, hemodynamic instability, arrhythmias or pulmonary edema, is hospital admission to the telemetry unit to rule in/out ACS.[2] While the telemetry unit is an appropriate level of care during the rule out phase of ACS, acute complications requiring a higher level of care in the intensive care unit (ICU) can occur. Studies show that hospitalized patients who require unplanned transfer from medical or transitional care units to the ICU have higher rates of in-hospital mortality, longer length of hospitalization and increased resource utilization.[3-7] However, most of these studies included patients from varied diagnostic categories (i.e., respiratory, cardiac, endocrine, gastrointestinal, cancer, etc.), and did not evaluate patients presenting with possible ACS admitted to telemetry units.

The primary aim of this study was to determine the frequency of unplanned transfer from telemetry to ICU, among hospitalized telemetry unit patients presenting for suspected ACS. The data used for this study came from a larger study (described below) that was designed to evaluate the frequency of transient myocardial ischemia identified with a 12-lead Holter recorder. We had the unique opportunity to examine these ECG data retrospectively to determine the presence/absence of myocardial ischemia prior to unplanned transfer. Hence, a secondary aim was to examine whether ECG ST-segment changes, measured with a 12-lead Holter recorder, and/or symptoms preceded unplanned transfer from telemetry to the ICU.

## Methods

This was a secondary analysis using data from the COMPARE study (R21 NR-011202, PI: MMP), the design of which has been described previously.[8] The COMPARE Study was a prospective observational study designed to examine the frequency and consequences of

transient myocardial ischemia, measured with a 12-lead Holter recorder, in patients presenting to the emergency department with symptoms suggestive of unstable angina (UA) or non-ST-elevation ACS (NSTE-ACS).[9] The outcome of interest for the present study was unplanned transfer from telemetry to the ICU; hence patients from the primary study initially admitted to the telemetry unit will serve as the study sample. Unplanned transfer was identified following an acute clinical change(s) including; unrelieved chest pain/anginal equivalent, ECG changes, acute heart failure, arrhythmias, hemodynamic compromise, or cardiac arrest. Approval from local institutional review boards was obtained, and all patients provided written informed consent prior to participation.

## Sample/Settings

Inclusion criteria were: (1) presentation to the emergency department for treatment of UA, NSTE-ACS, or suspected ACS and (2) English speaking. Patients were excluded if, admitted for ST-elevation MI, were comatose, had a major psychiatric disorder, or isolation precautions. ECG exclusions were left bundle branch block or ventricular paced rhythm because these conditions distort the ST-segment, making it difficult to reliably interpret the ECG for ischemia.[8, 10]

Data were collected at three private hospitals. Each hospital had well-developed cardiac service lines; including board certified cardiologists, and a full range of invasive and non-invasive treatments available.

## Electrocardiographic Data Collection

A research nurse/assistant was present in the hospital during the hours of 7 am to 5 pm, Monday through Friday. Following evaluation in the emergency department, patients were either discharged home, because ACS had been ruled out, or were admitted to rule out ACS. Reported in this paper are only those patients initially admitted from the emergency department to the telemetry unit.

A 12-lead ECG Holter recorder (Mortara Instruments, Milwaukee, WI) was applied to patients meeting inclusion criteria. The Holter recorder data was not available to clinicians for decision making; rather off-line analysis (described below) was conducted after hospital discharge. To ensure high quality ECG data, a careful skin prep protocol was used by the research nurse/assistant. The skin on the torso was carefully prepped to remove any dirt, oils or creams that might interfere with signal quality, chest hair was cautiously clipped if necessary, and radiolucent ECG electrodes were applied in the Mason-Likar limb lead configuration. During the monitoring period, template ECGs were obtained with patients assuming supine, right- and left-side lying positions for use during off-line analysis to identify false positive ECGs due to positional changes.[8, 11, 12] The ECG Holter recorder remained in place until the patient was discharged home. All patients were maintained on the hospital's bedside ECG monitor (five or six lead system) as per the hospital protocol. The research nurse/assistant made frequent rounds during the day to maintain accurate placement of the ECG electrodes/lead wires and reapply any that had fallen off or been taken off for procedures (e.g., cardiac catheterization, echocardiogram, X-ray, etc.).

### ECG Ischemia Analysis

The 12-lead ECG Holter data were downloaded to a research computer and analyzed after hospital discharge using H-Scribe Analysis System (Mortara Instruments, Milwaukee, WI). Transient myocardial ischemia was defined as ST deviation (elevation or depression) ≥ 100 microvolts in ≥ 1 ECG leads ≥ 60 seconds measured at J + 60 milliseconds.[10, 13] The H-Scribe software displays 24 hours of ECG tracings into trended data for easy inspection, and semi-automatically analyzes and codes myocardial ischemia events. While the H-Scribe provides semi-automated analysis, all of the ECG data were manually over read by the principal investigator (MMP) who was blinded to the hospital course and clinical outcomes. In cases where there were questions about whether transient myocardial ischemia was present/absent, two co-investigators (MGC, TMK) reviewed the ECG data and consensus was reached.

### Medical Record Data

The research nurse/assistant obtained demographic, clinical and outcome data from the electronic health record. For this current analysis, medical records were carefully examined in those patients with an unplanned transfer to determine events prior to transfer, including, symptoms, interventions and time of transfer to the ICU. We also assessed whether the bedside ECG monitor alarmed or alerted the nurses to acute clinical changes prior to unplanned transfer.

### Statistical Analysis

Data were analyzed using SPSS 22.0 (IBM Corporation 1994, 2014). Descriptive statistics were used to report demographic (i.e., age, gender, and ethnicity) and clinical information including medical history (i.e., prior angina, prior MI, hypertension, hyperlipidemia, diabetes, prior cardiac procedures, and CAD). These values are expressed as means ± standard deviation and percentages for the entire sample, and by group (no unplanned transfer versus unplanned transfer). Categorical variables were analyzed with $\chi^2$ analyses. Two sided Fisher's Exact Test p-values are reported because of the small sample size of those experiencing an unplanned transfer. Two-tailed unpaired Student *t*-tests were used to compare continuous variables. A paired t-test was used to compare time variables of interest (i.e., time to ECG detected myocardial ischemia and time to symptoms prompting transfer to the ICU). A p value of $< 0.05$ was adopted as the critical value to determine whether differences between the two groups (no unplanned transfer versus unplanned transfer) were statistically significant.

## Results

A total of 488 patients were enrolled in the primary study. Of these, 409 (84%) were admitted from the emergency department to the telemetry unit for rule out ACS. Of the 409 patients initially admitted to the telemetry unit, 9 (2.2%) experienced an acute clinical change that prompted an unplanned transfer to the ICU. Table 1 shows the sample demographics and clinical characteristics for the 409 telemetry unit patients, and with the group divided by unplanned transfer (no/yes). There were no differences when comparing patients not transferred to patients transferred to the ICU with regards to demographics,

cardiac history, or cardiac risk factors. In our small sample of nine patients who had an unplanned transfer, while not statistically different, there was a trend for patients in the unplanned transfer group to have a history of coronary artery disease, prior percutaneous coronary intervention and a history of hypertension. A higher proportion of patients in the unplanned transfer group had coronary angiography as compared to the no transfer group. Time from hospital presentation to initiation of 12-lead Holter recording was similar between the two groups. Total 12-lead Holter recording time was 24 hours for the entire sample, and longer in those with unplanned transfer. This was likely due to the length of hospitalization, which was longer in the patients with unplanned transfer.

Table 2 shows the nine patients with unplanned transfer and the reason for transfer. The mean time from admission to ICU transfer was 13 ± 6 hours, most were men, and the mean age was 65 ± 11. One patient was transferred due to acute renal and hepatic failure, which required dialysis. Four patients were transferred following a cardiac catheterization procedure, with attempted percutaneous coronary intervention that was unsuccessful, and four due to recurrent angina.

Table 3 shows time variables for onset of ECG detected myocardial ischemia and onset of symptoms prompting ICU transfer. While mean time from admission to transfer was 13 ± 6 hours, mean time to ECG detected ischemia was 6 ± 5 hours, and 8.8 ± 5 hours for symptoms prompting transfer. While there was a trend for time to ECG detected myocardial ischemia to be shorter than the time to symptoms prompting transfer to the ICU the paired t-test showed this difference was not statistically different ($p = 0.059$). In two patients ECG detected ischemia and acute symptoms prompting transfer were simultaneous. In five patients, ECG detected ischemia was clinically silent. All patients eventually had symptoms that prompted transfer to the ICU. In all nine patients, there was no documentation or nursing notes regarding bedside ECG monitor changes prior to unplanned transfer.

## Case Study

Figure 1; A, B, and C are used to illustrate one case of unplanned transfer. The patient was a 71 year old female brought by ambulance to the emergency department at 8:50 am with complaints of crescendo angina over the course of the past 24 hours. Her clinical history included coronary artery disease, prior stent in the circumflex, hypertension, diabetes, hyperlipidemia, and renal insufficiency. Initial troponin I was 0.133 ng/dl (reference range > 0.4 ng/dl) and her initial 12-lead ECG was unremarkable for acute ST changes. She was admitted to the telemetry unit and scheduled for a cardiac catheterization procedure for later in the afternoon. While awaiting cardiac catheterization, three transient ischemic events were noted (Figure 1 A). No ECG changes were documented by the nurse who was monitoring leads V1 and II as per hospital protocol. Figure 1 B shows 12-lead ECG's before and during the first transient ischemic event.

The pause in recording noted in Figure 1 A from 1400 to 1600 was during cardiac catheterization when an attempt to place a stent in the right coronary artery (RCA) was unsuccessful. Optimal medical therapy was ordered and the patient was transferred back to the telemetry unit and the research Holter reapplied. Figure 1 C shows 12-lead ECG's prior to cardiac catheterization and immediately after cardiac catheterization and failed PCI

attempt. Within minutes after arrival on the telemetry unit the patient complained of worsening chest pain, and shortness of breath. The patient continued to deteriorate and a code blue was called at 1725. The patient was transferred to the ICU intubated and diuretics administered to treat acute pulmonary edema due to left ventricular failure. Coronary artery bypass graph surgery was not pursued due to her clinical instability. The patient's length of stay was 20 days. She was transferred to a skilled nursing facility at discharge because she required rehabilitative therapy.

## Discussion

In hospitalized patients with suspected ACS, while unplanned transfer from the telemetry unit to the ICU is uncommon, it is associated with prolonged hospitalization and in some patient's significant clinical burden (i.e., mechanical ventilation, drug therapies to maintain vital signs). Two primary clinical scenarios were identified; (1) following unsuccessful PCI, and (2) recurrent angina. ECG detected ischemia preceded transfer, and occurred on average 6 hours after hospital admission. Symptoms prompting unplanned transfer occurred, but happened on average 8.8 hours after hospital admission, which was nearly three hours after ECG detected ischemia. However, this difference was not statistically different in this small sample of patients.

Our rate of unplanned transfer to the ICU is similar to that reported in several recent studies (2% to 5%).[3-6] However, direct comparisons to our sample of suspected ACS patients is difficult because these studies included both medical/surgical and transitional care units, and examined multiple diagnostic categories (i.e., respiratory, cardiac, endocrine, gastrointestinal, cancer, etc.), and not specifically rule out ACS patients. Our results are similar to a study done in a cardiac patient group published nearly two decades ago by Stewart et al.,[7] In their study, 2.5% of patients discharged from their ICU experienced unplanned readmission from telemetry to the ICU. Similar to our study, the most common cause was recurrent angina. In an extension of this finding, we showed that transient ischemia detected with 12-lead ECG Holter, occurred nearly 3 hours prior to anginal symptoms. This finding is not surprising since the pathology of UA/NSTE-ACS is dynamic, characterized by cycles of thrombotic occlusion followed by spontaneous coronary recanalization or reperfusion, termed “intermittent reperfusion”.[14] Thus, clinical features such as symptoms and ST-segment changes often last for only minutes then disappear. Intermittent reperfusion is illustrated vividly in Figure 1, when during continuous 12-lead Holter recording three episodes of transient ST-segment elevation is seen. While symptoms can occur during ischemia, numerous studies have shown that the vast majority of *transient* ischemic events detected during continuous ECG monitoring are clinically silent, yet are associated with untoward patient outcomes.[9, 15-20] We found that only two of the eight patients with transient myocardial ischemia experienced symptoms during ECG detected ischemia. Of note, our research group has shown that symptoms are more likely to occur when; ischemia is of longer duration, ST magnitude is higher, and when the ST pattern is elevation, rather than depression.[15, 17] In the present study, while symptoms eventually prompted transfer; the mean time to ECG detected ischemia was earlier, which may suggest that ischemic burden had reached a tipping point resulting in symptoms and subsequent transfer to the ICU.

Our ECG data were collected in the context of research; hence, clinicians did not have access to this information. When reviewing medical records, we did not find documentation of alarms or other information indicating that the bedside ECG monitor had alerted nurses to the patient's acute clinical changes. This is not surprising because nurses do not typically turn on the ST-segment monitoring software, due to high numbers of false alarms, [21] and the bedside monitor displays only leads V1 and II at the central station, rather than the recommended 12-leads for ischemia detection.[10] Because of these ECG limitations, it is not surprising clinicians are often unaware of ongoing or recurrent ischemia, which is unfortunate since this is a key assessment in patients with suspected ACS.

Unplanned transfer occurred in several patients following unsuccessful PCI; hence, return to the telemetry unit in these select patients should be done with caution. One strategy in these patients should include the cardiac catheterization laboratory nurse communicating this outcome to the telemetry unit nurse prior to transfer, to ensure the patient is monitored carefully for recurrent or on-going ischemia. One additional consideration in this specific patient group would be to obtain a 12-lead ECG following cardiac catheterization to assess whether ongoing ischemia is present. In our case study, on-going ischemia was seen immediately following cardiac catheterization and failed PCI attempt (Figure 1 C). If clinicians had been aware of this finding, the patient could have been admitted to the ICU, rather than the telemetry unit, where aggressive therapies aimed at treating on-going myocardial ischemia could have been initiated, which may have possibly averted the code blue event.

## Limitations

The number of patients included in our study, and the number of unplanned transfer is very small. Hence, generalizability of our results is limited. In addition, with regards to timing of symptom onset, we used the time that was documented in the electronic health record. Because nurses often document symptoms and other patient findings well after the event(s) occurred from memory, the exact time of symptom onset was not likely recorded in the electronic health record.

## Conclusions

In patients with suspected ACS, while unplanned transfer from telemetry to ICU is uncommon, it is associated with prolonged hospitalization. Two primary scenarios were identified; (1) following unsuccessful PCI, and (2) recurrent angina. Symptoms prompting unplanned transfer occurred, but happened on average 8.8 hours after hospital admission; whereas ECG detected ischemia preceding unplanned transfer occurred on average 6 hours after hospital admission.

## Implications & Future Directions

Identification of dynamic ST segment changes in patients with suspected ACS could identify patients not responding to anti-ischemia therapies; thus allowing timelier reperfusion interventions. Though continuous ECG ST-segment monitoring is an ideal way to identify

transient or on-going myocardial ischemia in patients with suspected ACS, its utility is limited because of the high number of false positive alarms and an inadequate number of ECG leads available for ST analysis. On-going research efforts that emphasize both; (1) clinical use of ST-segment monitoring software (how and in whom), and (2) software algorithm improvements (multi-lead, contiguous leads) should remain a focus to improve clinical care to patients with suspected ACS.

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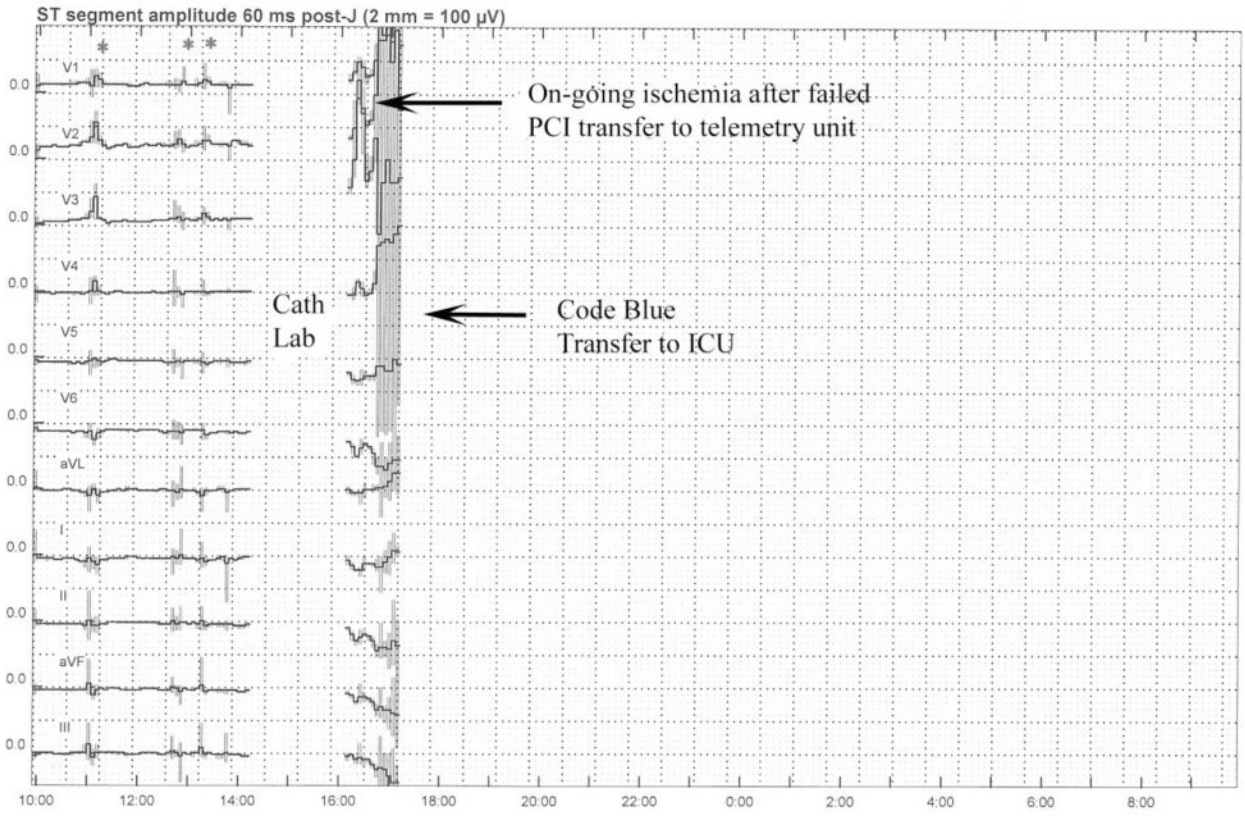
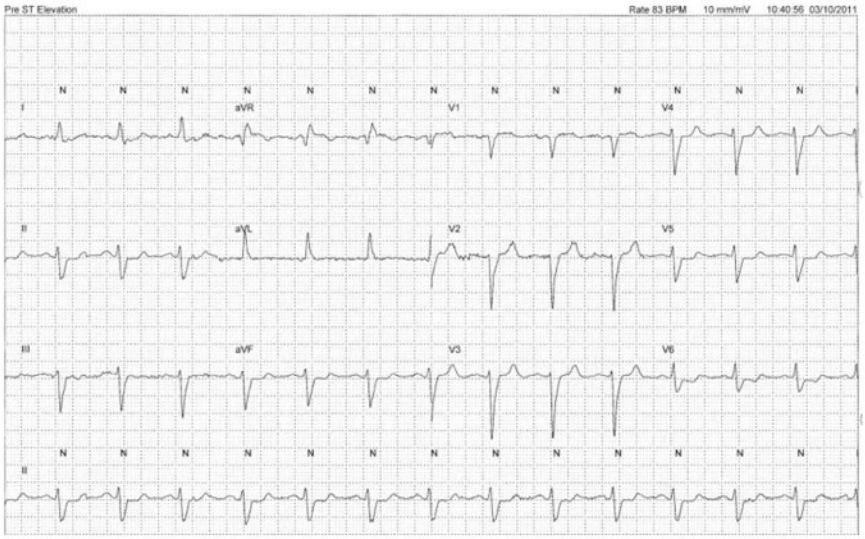
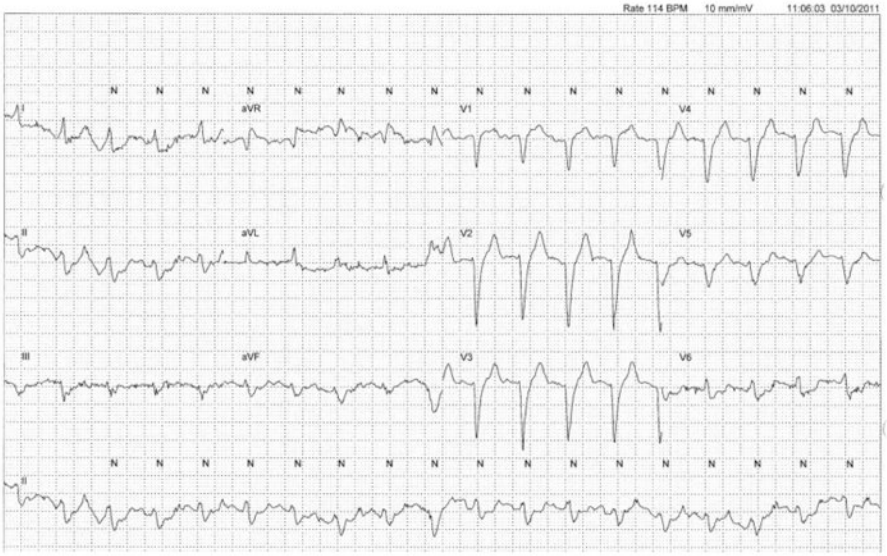


Prior to Transient Myocardial Ischemia (10:40:56)




During Transient Myocardial Ischemia (11:06:03)



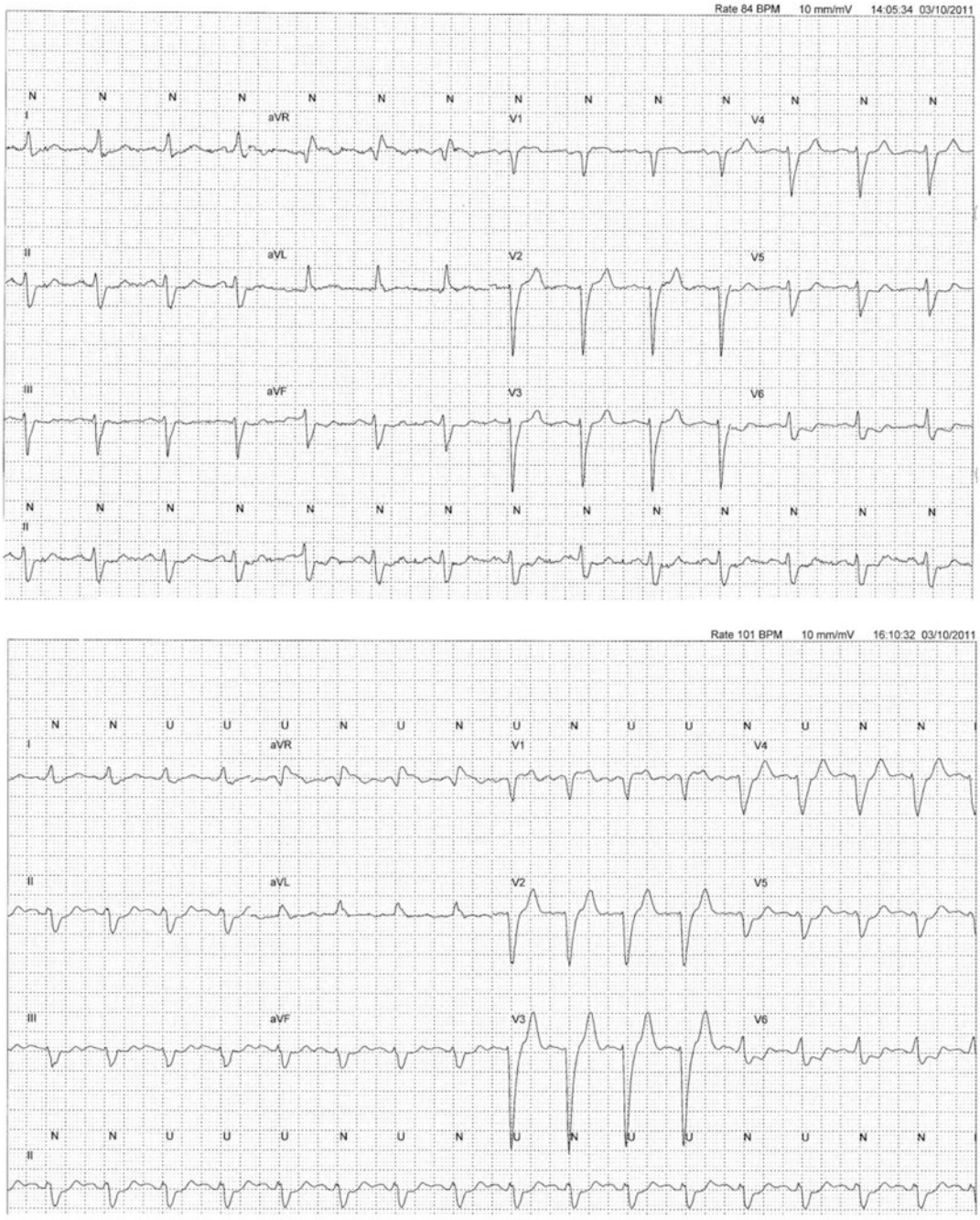



**Figure 1.**

**Figure A** ST-segment trend in 11 electrocardiographic (ECG) leads (Y-axis; lead - aVR not shown) from a Holter recording during six hours (X-axis) of recording. While awaiting cardiac catheterization, three transient myocardial ischemic events occurred (*); 1106, 1255, and 1315 (ST elevation V1 – V4). Following cardiac catheterization and failed percutaneous coronary intervention (PCI) there is on-going ischemia (arrow). The patient was transferred back to the telemetry unit, and approximately one hour later a code blue was called due to acute pulmonary edema (arrow).

**Figure B**. 12-leads ECG prior (top) to and during (bottom) transient myocardial ischemia.; Prior to Transient Myocardial Ischemia (10:40:56); During Transient Myocardial Ischemia (11:06:03)

**Figure C**. The top 12-lead ECG was obtained prior to cardiac catheterization. The bottom 12-lead ECG was obtained when Holter monitoring was resumed after cardiac catheterization and failed percutaneous coronary intervention.

## Table 1

**Demographic, Clinical History and Hospital Treatment for All Patients Admitted to Telemetry Unit for Rule Out Acute Coronary Syndrome Total Sample and by Absence/ Presence Unplanned Transfer**

| Characteristics | Study Sample n = 409 | No Unplanned Transfer n = 400 (97.6%) | Unplanned Transfer Telemetry to CCU n = 9 (2.2%) | p-Value No Transfer vs Transfer |
|---|---|---|---|---|
| | n (%) | n (%) | n (%) | Fisher's Exact Test |
| **Demographics** | | | | |
| **Age** (mean ± SD, in years) | 64 ± 13 | 64 ± 13 | 67 ± 11 | 0.257 |
| **Gender** | | | | |
| Male | 244 (60) | 238 (60) | 6 (67) | 0.746 |
| **Race** | | | | |
| Asian | 9 (2) | 9 (2) | 0 | |
| American Indian/Alaskan Native | 5 (1) | 5 (1) | 0 | 0.937 |
| Black | 12 (3) | 12 (3) | 0 | |
| Pacific Islander | 4 (1) | 4 (1) | 0 | |
| White | 379 (93) | 370 (93) | 9 (100) | |
| **Race Non-White** | 30 (7) | 0 | 0 | - |
| **Cardiac history** | | | | |
| Prior coronary artery disease | 191 (47) | 185 (46) | 6 (67) | 0.315 |
| Prior acute myocardial infarction | 120 (29) | 117 (29) | 3 (33) | 0.726 |
| Prior percutaneous coronary intervention | 108 (26) | 103 (26) | 5 (56) | 0.059 |
| Prior coronary artery bypass graft | 68 (17) | 66 (17) | 2 (22) | 0.649 |
| **Risk factors** | | | | |
| Current Smoker | 102 (25) | 99 (25) | 3 (33) | 0.696 |
| High cholesterol | 248 (61) | 242 (61) | 6 (67) | 1.00 |
| High blood pressure | 278 (68) | 270 (68) | 8 (90) | 0.282 |
| Diabetes | 104 (25) | 102 (26) | 2 (22) | 1.00 |
| **Coronary Angiogram** | | | | |
| Yes | 165 (40) | 158 (40) | 7 (78) | 0.034* |
| **12-Lead ECG Holter Variables** | | | | |

| **Characteristics** | **Study Sample n = 409** | **No Unplanned Transfer n = 400 (97.6%)** | **Unplanned Transfer Telemetry to CCU n = 9 (2.2%)** | **p-Value No Transfer vs Transfer** |
|---|---|---|---|---|
| | **n (%)** | **n (%)** | **n (%)** | **Fisher's Exact Test** |
| Time from presentation to Holter start (hours: minutes, ± SD) | 6 ± 5 | 6 ± 5 | 4 ± 4 | 0.299 |
| Total Holter Time hours (SD) | 24 ± 17 | 24 ± 16 | 47 ± 36 | 0.090 |
| **Hospital Length of Stay** | | | | |
| Days (mean, SD) | 2 ± 2 | 2 ± 2 | 6 ± 4 | 0.018** |

Coronary Care Unit = CCU;

$p < 0.05$ = *;

$p < 0.001$ = **

**Table 2**

**List of nine patients who had an unplanned transfer from the telemetry unit to the cardiac intensive care unit due to acute clinical changes requiring a higher level of care**

| Patient | Age | Gender | Time from Admit to Transfer (hours) | Reason for Unplanned Transfer |
|---|---|---|---|---|
| #1 (49) | 71 | Female | 9 | Had cardiac catheterization, attempted PCI that was unsuccessful |
| #2 (236) | 51 | Male | 8 | Had cardiac catheterization, attempted PCI that was unsuccessful |
| #3 (249) | 72 | Female | 20 | Had cardiac catheterization, attempted PCI that was unsuccessful |
| #4 (313) | 58 | Male | 9 | Had cardiac catheterization, attempted PCI that was unsuccessful |
| #5 (275) | 76 | Male | 17 | Recurrent chest pain and increased blood pressure |
| #6 (302) | 78 | Female | 7 | Recurrent chest pain, shortness of breath |
| #7 (337) | 51 | Male | 6 | Recurrent chest pain, shortness of breath, diaphoresis |
| #8 (445) | 63 | Male | 17 | Recurrent chest pain, low blood pressure |
| #9 (140) | 80 | Male | 23 | Acute renal and hepatic failure |
| Total | Mean, SD | | Mean, SD | |
| | 67 ± 11 | 6/9 (67% male) | 13 ± 6 | |

PCI = percutaneous coronary intervention; SD = standard deviation

**Table 3**

**Time variables for nine patients who had an unplanned transfer from the telemetry unit to the cardiac intensive care unit due to acute clinical changes requiring a higher level of care**

| Patient | Age | Gender | Time from Admit to ICU Transfer (hours) | Time from Admit to Symptoms Prompting Transfer (hours) | ECG Detected Myocardial Ischemia 12-lead Holter | | Reason for Unplanned Transfer |
|---|---|---|---|---|---|---|---|
| | | | | | Time from Admit to ECG Ischemia | Symptoms with ECG Ischemia | |
| #1 | 71 | Female | 9 | 7 | 3 | No | A |
| #2 | 51 | Male | 8.5 | 8 | 8 | Yes | A |
| #3 | 72 | Female | 20 | 19 | 18 | No | A |
| #4 | 58 | Male | 9 | 8 | 7 | No | A |
| #5 | 76 | Male | 17 | 8 | 4.5 | No | B |
| #6 | 78 | Female | 7 | 5.5 | 3 | No | C |
| #7 | 51 | Male | 6 | 3 | 3 | Yes | D |
| #8 | 63 | Male | 17 | 12 | 1 | No | E |
| #9 | 80 | Male | 23 | No acute symptoms - based on lab tests | No ischemia | - | F |
| Total | Mean, SD | | Mean, SD | Mean, SD | Mean, SD | | |
| | 67 ± 11 | 6/9 (67% male) | 13 ± 6 | 8.8 ± 5 | 6 ± 5 | 2/8 (25%) | |

Reasons for unplanned transfer: A = Had cardiac catheterization, attempted PCI that was unsuccessful; B = Recurrent chest pain and increased blood pressure; C = Recurrent chest pain, shortness of breath; D = Recurrent chest pain, shortness of breath, diaphoresis; E = Recurrent chest pain, low blood pressure; F = Acute renal and hepatic failure