CPB FMEA # 31 Human Fatigue Failure

Friends-

I have never seen a set of perfusion structure standards (not even mine) that incorporated a policy and procedure for dealing with fatigue. But the Joint Commission thinks fatigue among health care workers is important enough to publish a Sentinel Event Alert, Issue 48, Dec 14, 2011 on the subject. In fact most of the content of this FMEA comes directly from that alert document.

We have all worked until we were bone-deep tired; maybe even dosing off behind the pump. I know that I loved pumping cases, but I hated working when I was fatigued or sleepy. I did not feel that I was at my best in taking care of the patient. In particular, perfusionists diagnosed with sleep apnea should consider medical treatment because they can be a hazard even when their work schedule is not excessive. There are many people wandering around with undiagnosed sleep apnea and that probably includes a significant number of perfusionists.

For safety reasons, governmental regulations limit the work hours for certain professions such as airline pilots, train engineers, OTR truck drivers and even physicians in training (but not nurses or perfusionists). At some programs it is not unusual for perfusionists to work an average of 60+ hours per week because they were expected to keep up with the surgeons.

I once worked for two surgeons. One operated on Mondays and Wednesdays, the other on Tuesdays and Thursdays. They traded call every other Friday and weekends. Usually they would only do one scheduled CPB case each day. But sometimes they did two or even three cases. I sometimes found myself completing one day’s work just in time to start the next day with a new surgeon. It was just expected that I keep up. Under those conditions I was sure that my performance was impaired by my fatigue. You could say that the surgeons had a long day (and night) as well except for the fact that they always had the next day off. As years passed I finally got help. But if there are still perfusionists who work under similar conditions, perhaps this FMEA will help make their case for more help to the right people.

The AmSECT Guideline 15.1 is not much help. It states: “The Perfusionist should receive a minimum of 8 hours of rest period for every 16-hour consecutive work period.” I believe it should be the other way around; a minimum of 16 hours rest for every 8-hour consecutive work period. Under the AmSECT Guideline a perfusionist could be regularly scheduled for five daily 12 hour work periods each week (12 hours X 5 days/week = 60 regular hours/week plus ‘on call time’) and still be compliant with professional standards.

Many perfusionists are exempt employees. An exempt employee has no rights at all under the Fair Labor Standards Act (FLSA) rules for overtime limitation. Nothing in the FLSA prohibits an employer from requiring exempt employees to work a difficult schedule. Nor does the FLSA limit the amount of work time an employer may require or expect from any employee on any schedule. Mandatory overtime is not limited by the FLSA for exempt perfusionists. In fact, besides posing a greater risk to patients, perfusionists who routinely work more than 45 hours per week may be sacrificing their own health and wellbeing down the road in future decades.

Please review the attached FMEA and send me your feedback. I think that there may be a perspective on fatigue that is unique to the perfusion profession that I have overlooked. So send me your stories and comments. As always, thanks for your help.

AmSECT Safety Committee

Gary Grist RN CCP, contributor.

<garygrist@comcast.net>

FAILURE MODE AND EFFECTS ANALYSIS: CPB FMEA # 31 Human Fatigue Failure

FAILURE:

Failure to prevent human fatigue from extended work schedule, lack of sleep, or sleep apnea of personnel operating CPB. (Much of this material comes from the Health Care Worker Fatigue & Patient Safety, The Joint Commission Sentinel Event Alert, Issue 48, December 14, 2011)

EFFECT:

Fatigue from extended shift work, lack of sleep or sleep apnea can lead to:

1. Lapses in attention.
2. Inability to stay focused.
3. Reduced motivation.
4. Compromised problem solving.
5. Confusion.
6. Irritability.
7. Memory lapses.
8. Impaired communication.
9. Slowed or faulty information processing and judgment.
10. Diminished reaction time.
11. Indifference and loss of empathy.
12. A fatigue related minor error was reported by 66% of perfusionists and 6.7% admitted to a serious accident during CPB (Trew 2011).
13. Patient or perfusionist injury of indeterminate magnitude.
14. Work schedules averaging 45+ hrs/week over 10 years or untreated sleep apnea greatly increases the risk of developing cardiovascular disease (Conway 2016) (Yaggi 2016).

CAUSE:

1. Fatigue can have physical, mental, and/or emotional causes:

Physical: Examples – lack of sleep, poor nutrition, dehydration, pain, illness, untreated sleep apnea.

Mental: Examples –depression, stress.

Emotional: Examples – fear, relationship disturbances.

1. Extended shift length, excessive work schedule or untreated sleep apnea can result in the health care worker being three times more likely to make an error in patient care.
2. Work shifts of 24 hours result in 36% more serious adverse events than shifts of 16 hours or less. This includes 61% more sharps injuries after the 20th consecutive hour of work and 300% more fatigue-related preventable adverse events that lead to patient death.
3. Work weeks averaging 45+ hrs/week over 10 years greatly increase the risk of developing cardiovascular disease.

PRE-EMPTIVE MANAGEMENT:

1. Assess perfusion staff schedule for fatigue-related risks.
2. Average hours worked per employee.
3. Length of shift.
4. Number of off-shift hours.
5. Number of consecutive work shifts
6. Update staffing policies with staff suggestions to minimize potential for fatigue.
7. Any staff exhibiting frequent daytime drowsiness should seek evaluation for sleep apnea.
8. Provide opportunities for staff to express concerns about fatigue; i.e., work place counseling.

4. Give support to staff when appropriate concerns about fatigue are raised and take action to address those concerns.

1. Encourage teamwork as a strategy to support staff working extended hours to protect patients from potential harm:
2. Ensure that relief personnel are prompt.
3. Patient hand-offs are high risk for errors, especially for fatigued staff. Assess hand-off procedures to ensure patient safety.
4. Perfusionists with sleep apnea should seek treatment since they might experience symptoms of fatigue without an excessive work schedule or mental/emotional cause.

MANAGEMENT:

1. Implement a fatigue management plan with countermeasures for fighting fatigue:

a. Engage in animated conversations with others (not just listening and nodding)

b. Engage in physical activity or change body position (even if it is just standing or stretching).

c. Utilize sensory stimulation (enhanced lighting, room temperature change, wash hands and face, slow breathing with pursed lips, place cool rag to back of neck).

d. Drink fluids to be well hydrated.

e. Consume small, high energy snacks.

f. Discourage distractions.

g. If possible, take short naps (less than 45 minutes).

h. Use strategic caffeine consumption. Don’t use caffeine if already alert. Avoid caffeine near a sleep period. Perfusionists should only consider the ingestion of caffeine (up to 1000 mg per day) as an alertness-enhancing strategy when the situation offers no other viable alternative. Caffeine should be used judiciously and only when it is truly needed to reduce the impact of fatigue.

2. Maximize fatigue countermeasures effectiveness by using different combinations or sequences of countermeasures.

3. Use a system of independent double checks for critical or complex tasks.

4. Consider fatigue as a possible contributing factor when reviewing all adverse events.

RISK PRIORITY NUMBER (RPN):

A. Severity (Harmfulness) Rating Scale: how detrimental can the failure be:

1) Slight, 2) Low, 3) Moderate, 4) High, 5) Critical

(I would give this failure a Moderate RPN, 3\*.)

B. Occurrence Rating Scale: how frequently does the failure occur:

1) Remote, 2) Low, 3) Moderate, 4) Frequent, 5) Very High

(The Occurrence is Moderate, so the RPN would be a 3\* .)

C. Detection Rating Scale: how easily the potential failure can be detected before it occurs:

1) Very High, 2) High, 3) Moderate, 4) Low, 5) Uncertain. (The Detectability RPN equals 3\*.)

D. Patient Frequency Scale: 1) Only a small number of patients would be susceptible to this failure, 2) Many patients but not all would be susceptible to this failure, 3) All patients would be susceptible to this failure.

(All patients would be at risk. So the Frequency RPN would be 3\*.)

Multiply A\*B\*C\*D = RPN. The higher the RPN the more dangerous the Failure Mode.

The lowest risk would be 1\*1\*1\*1\* = 1. The highest risk would be 5\*5\*5\*3 = 375. RPNs allow the perfusionist to prioritize the risk. Resources should be used to reduce the RPNs of higher risk failures first, if possible. (The total RPN for this failure is = 3\*3\*3\*3 = 81. However, this RPN is one that is particularly dependent upon working conditions at each program. \*These RPNs are entirely dependent upon individual perfusion program staffing and work schedules. Programs with minimal staffing and longer work hours are going to be riskier and have a higher RPN than programs with adequate staffing with redundancy.)