Clinical Case Conferencing: Advancing Signature Pedagogy with Error Analysis Utilizing an IP Practice Model

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Medical Error: Since *To Err is Human*

Medical error was ranked as the 8th leading cause of death in the U.S. at an estimated 98,000 deaths/year (Institute of Medicine, 2000).

Medical error is now ranked as the 3rd leading cause of death in the U.S. with an estimated 210,000 - 400,000 deaths/year (Makary & Daniels, 2016).

Why are so many more dying and what can we do about it?

Assessment of Causality

Association of Women Surgeons categorize adverse events into 1 of 3 causal determining factors that include (Gurien et al., 2016):

- Concomitant comorbidities
- Behavior directly related to the healthcare team
- Unexpected or unplanned outcomes

Adverse Events due to Comorbidities

Concomitant Comorbidities

- Adverse events directly attributed to preexisting disease or made worse by preexistent disease (Gurien et al., 2016).
- Patients with comorbidities are at increased risk of harm especially in regard to diagnostic accuracy (Graber, 2013).

Adverse Events due to Provider Behavior

Behavior directly related to healthcare care team interventions resulting in error (Kwok et al., 2016).

Most frequently identified cognitive issues:

- Communication breakdown
- Anchoring
- Bandwagon effect

Preventable Adverse Events

Unexpected or unplanned outcomes (Gurien et al., 2016):

- Related to comorbidities or team behavior
- Unplanned procedures
- Unanticipated results

Traditional MMC

The morbidity and mortality conference (MMC) is a retrospective analysis of what went wrong.

Original purpose represented an opportunity to openly discuss mistakes (Gerstein et al., 2014).

Fordham et al. (Writer), & Trilling, L. (Director). (2002, March 12). My Tuscaloosa Heart. In Lawrence, B (Executive Producer), Scrubs. North Hollywood, CA., NBC.

Traditional MMC

However, the MMC is seen by some as a punitive approach to assigning blame for adverse events while failing to consider system processes related to the behavioral choices of providers (Boysen, 2013).

Morbidity and Mortality Conference: Structure/Function

The MMC brings providers together for case review of medical errors and adverse events to reduce future preventable deaths and harm (Tad-y et al., 2016)

- Forum for root-cause analysis of adverse events
- Provide residency training, continuing medical education and professional development
- Model of IP collaborative practice

IP-MMC: Root-Cause Analysis of Adverse Events

MMC provides a strategy for a transparent method of error analysis (Tess et al., 2015).

Shift from individual blame to development of a just culture (Boysen, 2013).

Investigation in the MMC focuses on systems-based process of error analysis (Gonzalo et al., 2014) linked with quality improvement (Gerstein et al., 2013).

IP-MMC Education

Pedagogy of case-based learning (Shulman, 2005).

Association of American Medical College's (AAMC) Educating for Quality (ae4Q) programs recommend the MMC for improving patient care (Benassi, 2017; Davis & Rayburn, 2016).

Competencies in graduate medical education are linked to the MMC (Rosenfeld, 2005) and include IP collaborative practice (Tapper, 2016; Tad-y et al., 2016).

Table. 1 Comparison between levels of healthcare teamwork

	Seneviratne (2009)	IPEC Expert Panel (2011; 2016)	Shulman (2005a; 2005b)
Characteristics	**Multi- Inter-Disciplinary Practice**	**Interprofessional Collaborative Practice**	**Clinical Case Conference**
Intent	improve patient care	defragment healthcare	problem resolution
Cooperation	discipline specific	collaborative	deliberative dialogue
Communication	on an as-needed basis	continual and descriptive	routine and searching
Collaboration	reporting knowledge	pooling knowledge	challenging knowledge
Teamwork	physician-centered	patient-centered	patient in attendance
Task Orientation	independent	work jointly	communal questioning
Scheme	integrated	complexity	uncertainty
Engagement	conflicts unresolved	deal with conflict	constructive conflict

Why Competency Domains for the MMC?

Core Competencies aim to (IPEC, 2011)**:**

1. Coordinate provider knowledge and effort
2. Guide approaches and strategies for conference
3. Conform skills and terminology across professions
4. Prompt necessary deliberative dialogue
5. Provide medicolegal definitions for licensing or credentialing bodies IP collaborative practice

Competency Domain 1: IP-MMC Values/Ethics

Values and ethics are viewed as patient-centered along with a shared mental model toward safe and effective systems of care (Rosenfeld, 2005).

Competency Domain 1: IP-MMC Values/Ethics

MMC's consistently review:

- Ethics-based cases (Frey et al., 2016; Bevis et al., 2011)
- Ethical deliberation in cases (Carter and Guthrie, 2007)
- Related to residency training practice-based improvement logs (Rosenfeld, 2005)

Competency Domain 2: IP-MMC Roles/Responsibilities (RR)

Roles & Responsibilities for Individual Providers:

- Commit to refer cases, regularly attend and engage at MMC meetings.
- Responsible for providing any known relevant patient/case information while maintaining patient confidentiality (Classen & Killbridge, 2002).

Competency Domain 2: RR IP-MMC

Roles & Responsibilities for Individual Providers:

- Responsible for providing expert opinion at the MMC
- Knowledge of each providers roles and responsibilities
- Engage the team outside individual area of expertise (Classen & Killbridge, 2002)

Competency Domain 3: IP-MMC Interprofessional Communication (CC)

One of the ACGME core competencies for the MMC is effective IP dialogue between providers (Kravet, 2006; Rosenfeld, 2005).

IP communication at the MMC needs to prompt collaborative inquiry into the root-cause analysis of error and team recommendations.

Competency Domain 3: CC IP-MMC

Deliberative inquiry between the team on the MMC may provoke rational disagreements, moral conflict , and pluralistic perspectives in response to uncertainty – however, deliberate dialogue can progress into deliberate practice (Forester, 1999).

Competency Domain 4: IP-MMC Teams and Teamwork (TT)

The IOM (2001) has called for closing of the chasm in patient safety and quality of healthcare with teamwork – thought to integrate networks of IP collaborative practice in the MMC (Szekendi et al., 2010).

Competency Domain 4: TT IP-MMC

The Big Five and the Coordinating Mechanisms of Teamwork
(Salas et al., 2005)

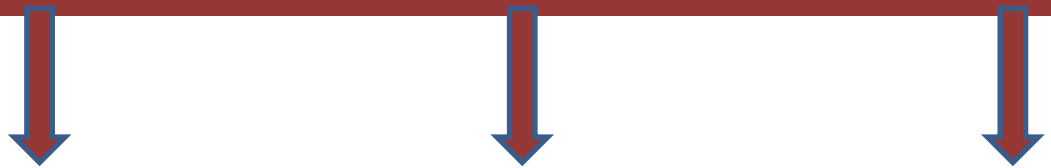
1. Team adapts a collective orientation
2. Routinely take other's behavior into account
3. Consider the importance of the MMC's goals over individual gains
4. Task interdependence, information pooling, and joint working to generate new knowledge/solutions
5. Reflect upon pluralistic dialogue by teammates and evaluate what is most correct

Competency Domain 4: IP-MMC Teamwork

Team approach is refocused from medical error and outcomes to system redesign, team accountability and learning behaviors (Boysen, 2013).

Teamwork can integrate the knowledge and experience of various professions through a *collectivist discourse of competence* (Lingard, 2009; p626) at the IP-MMC.

Clinical Case Conferencing



Patient Rounds

Tumor Board

Morbidity Mortality Conference

- **Pedagogies of Uncertainty (Shulman, 2005)**
- **Regularly Scheduled Series (RSS) (Eiser et al., 2013)**

Clinical Case Conferences

Effective interprofessional collaborative practice interventions are considered by Cochrane as limited to interprofessional rounds and meetings plus interprofessional checklists (Reeves et al., 2017; Zwarenstein et al., 2009).

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Patient Case Conferences

A clinical case conference is a process by which an interprofessional team of providers synchronously discuss the treatment plan with the patient or their representative by identifying the care needs, tasks and outcomes to be achieved (Davis & Thurecht, 2001).

Patients as Full Members of the IP Team

True interprofessional practice requires patient involvement in order to achieve the required conditions for collaboration (Balogh et al., 2015; Adams et al., 2014; Orchard, 2005).

Patient's posess insights into the occurrence and process of diagnostic errors (Balogh et al., 2015).

Their views are required to more often identify errors and near misses (Balogh et al., 2015).

IP Patient Conferences

Patients and families should be offered the opportunity to collaborate with providers as full members of the team at the MMC (Balogh et al., 2015).

Participation in the MMC may be gratifying to patients and their families as they help resolve and improve patient safety (Balogh et al., 2015).

Conferencing Model for the MMC

A model of care for this workshop is synthesized from the scholarly literature in medicine on patient case conferences (Abernethy et al., 2006; Shulman, 2005; Davis & Thurecht, 2001) with definitions, preparation, factors, processes and professional attributes for the MMC.

Conferencing Techniques for the MMC

Techniques for this workshop are created around the conditions for true IP collaborative practice (Adams et al., 2014; Orchard, 2005), and framed upon literature from professional education (Kindsvatter & Wilen 1981) that provide specific skills and strategies that can be applied in conference to encourage pluralistic dialogue between providers.

Conferencing Behavior Skills (Kindsvatter & Wilen, 1981)	**Characteristics**	**IPEC Competencies** (IPEC, 2016)
Climate Building	relationships and interpersonal rapport	VE9, RR7, CC7; Principles 1,5
Commentary	inference; guiding; paraphrase	RR6, CC1, CC5
Questioning	extend thinking; development	TT1, TT2
Openness	language and new terminology	CC2; Principles 8,6
Communication	concise information; advance dialogue	CC2, CC3; Principles 2,3,7
Teamwork	behaviors & shared decision making	TT2, TT3, TT4
Modeling	encourage ideas and opinions of other	CC4, RR3, RR4, RR9
Sensitivity	tone, empathy, praise	CC5; Principle 4

VE=Values/Ethics; RR=Roles/Responsibilities;CC=Communication;TT=Teams/Teamwork

MMC Conferencing Strategies Aligned with IP (Kindsvatter & Wilen, 1981)	
Target setting	Dual focus on patient and system
Balanced dialogue	Engaged two way discussions
Deliberate practice	New learning around care plan
Reflect nonjudgmentally	Non-punitive response
Feedback	Praise, encourage rather than evaluate
Closure	Summarize; clarifications; commitment
Assertiveness scripts & tools	ISBAR; CUS; DESC (AHRQ, 2015)

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Systems Audit

Use of a systems audit to critically review issues involving an adverse event is the hallmark of a systems approach competencies (Szostek et al., 2010):

- Systems auditor
- Structured case review
- Quality (QI) improvement tool

Systems Auditor

A neutral systems auditor performs tasks for the MMC that includes a structured case review (Szostek et al., 2010):

- Reviews all documents relevant to the case
- Interviews all providers, stakeholders and patient/family
- Performs a literature review
- Identify and address related systems issues

Improvement Tools at the IP-MMC

Requires performing a root-cause analysis that incorporates the use of an appropriate systems-audit, quality improvement tool such as the mind maps, system walks or cause-and effect “fishbone” diagram (*Ichikawa*) (Szostek et al., 2010).

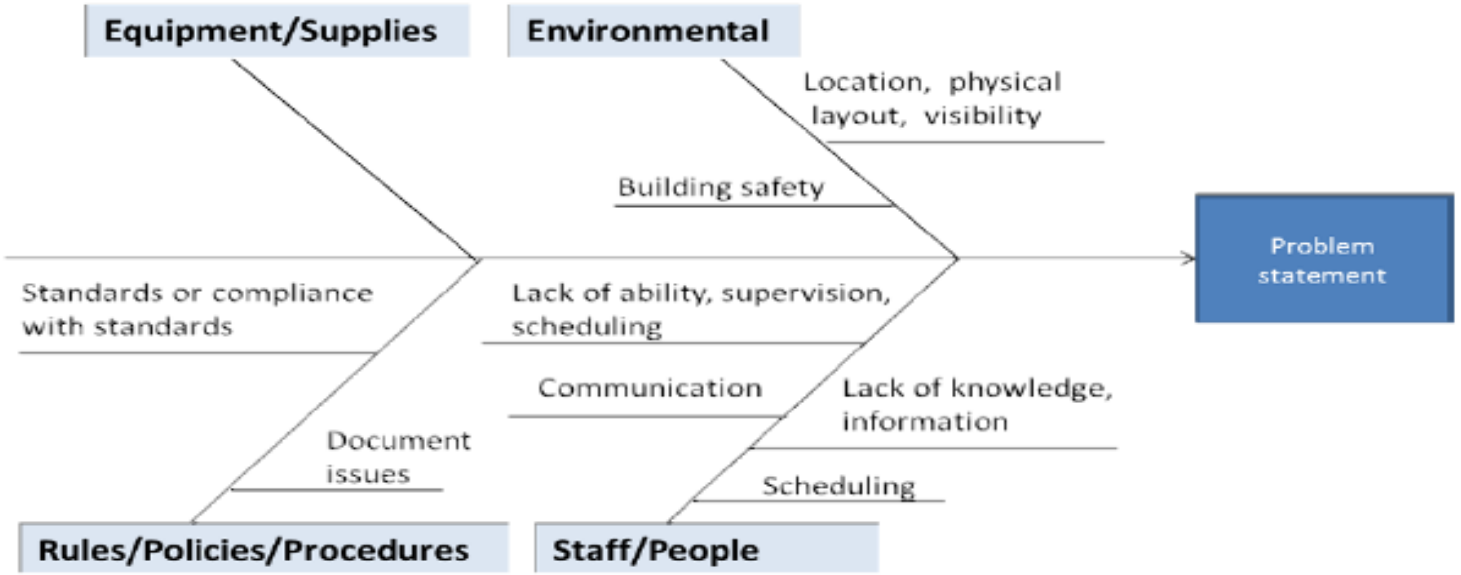
Five whys?

Primer on Root-Cause Analysis: Domains (AHRQ, 2017)

1) Needs process Improvement
2) Safety culture
3) Utilize risk assessment
4) Organizational issues/policies
5) Human factors
6) Information technology

6) Patient involvement
7) Use tools and guldelines
8) Processes and redesign
9) Measures and surveys
10) Medication safety
12) Needs simulation

Quality (QI) Improvement Tool: *Ishikawa*



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Centers for Medicare and Medicaid Services (CMS). (ND). *How to Use the Fishbone Tool for Root Cause Analysis*. U.S. Centers for Medicare & Medicaid Services, Baltimore, MD. Retrieved August 18, 2017 from https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/QAPI/downloads/FishboneRevised.pdf.

Considerative Checklist for Root Cause Analysis of Adverse Events		
Domain	Sub-Domains	Relevant
Risk Assessment	Problem statement, suicide/fall as models, interventions (needed and existing), instrument	Yes / No
Organizational	Issues, policies	Yes / No
System Redesign	Macro-level, systems-based practice, teamwork, quality assessment/improvement	Yes / No
Process Improvement	Micro-level, clinical processes, delays, meetings, teamwork, standardized protocols,	Yes / No
Information Technology	Access, medication safety, team diversity, consolidating health care, continuing education	Yes / No
Human Factors	Staff, stress, scheduling, workload, work pressure, ergonomics, capabilities, teamwork	Yes / No
Patient Involvement	Representation, family, patient as a team member, safety education, collaboratives	Yes / No
Safety Culture	Communication, shared mental model, joint strategies, teamwork, interventions	Yes / No
Measures	Hospital surveys, group surveys, team learning, outcomes, safety culture	Yes / No
Tools	Checklist, scripts, guidelines, decision, tracking	Yes / No
Simulation	Team performance, competencies, TeamSTEPPS, workshops, standardized patient	Yes / No
Environmental	Building, equipment, location, physical layout, visibility, team situation awareness	Yes / No

Domains adapted from AHRQ (2017) Advances in Patient Safety. Rockville, Md.

Quality Assessment (QA) Tool: *Five Whys?*

Problem statement	One sentence description of event or problem
Why? ➡	
Why? ➡	
Why? ➡	
Why? ➡	
Why? ➡	
Root Cause(s)	1. 2. 3. To validate root causes, ask the following: If you removed this root cause, would this event or problem have been prevented?

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Centers for Medicare and Medicaid Services (CMS). (ND). *Five Whys Tool for Root Cause Analysis*. U.S. Centers for Medicare & Medicaid Services, Baltimore, MD. Retrieved August 18, 2017 from https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/QAPI/downloads/FiveWhys.pdf.

IP-MMC Team Debriefing Form

Key Considerations:	Y	N
• Was there a sense of climate building and rapport among the team? (VE)		
• Was communication clear and effective during this event? (CC)		
• Were roles and responsibilities understood by all team members? (RR)		
• Did all members share in the decision making? (TT)		
Value/Ethics (VE); Roles/Responsibility (RR); Communication (CC); Teams/Teamwork (TT)		

Issue	Suggested Actions
What went well?	
What could we do better next time?	

(**I**dentify) who you are and your relation to the case.

(**S**ituation) statement of the problem (Mitchell et al., 2013).

(**B**ackground) relevant clinical information relevant (Lingard & Haber, 1999a,b)

(**A**ssessment) evaluation of what and why it happened

(**R_1** Review) literature review for evidence-based practices (Mitchell et al., 2013).

(**R_2** RCA) systems-based approach – *Ishikawa* (Szostek et al., 2010).

(**R_3** Recommendations) proposed actions

MMC CIAKI Case 1 – Identify

<u>Contrast Induced Acute Kidney Injury (CIAKI)</u>

Case is presented by the chief resident in radiology.

Relation to the case is as the assigned auditor 30 days ago.

MMC CIAKI Case 1 – **S**ituation

Admitting diagnosis was mesenteric ischemia (impaired blood flow to the intestines), possibly secondary to emboli due his atrial fibrillation.

A non-contrast CT study missed the diagnosis and the patient likely died from a delay in treatment.

MMC CIAKI Case 1 – **B**ackground 1

A 66yo man with a history of atrial fibrillation (without anticoagulation) presented with abdominal pain and hematochezia (bloody stool).

He was febrile with abdominal pain upon examination.

Laboratory test results were notable for new acute kidney injury (creatinine 1.8 mg/dL, up from a baseline of 0.6 mg/dL).

MMC CIAKI Case 1 – **B**ackground 2

The emergency department provider believed a CT study with contrast was the best diagnostic test to evaluate for possible mesenteric ischemia.

Out of concern for contrast-induced nephropathy in the setting of acute kidney injury, the physician instead ordered a non-contrast abdominal CT scan.

MMC CIAKI Case 1 – **B**ackground 3

This scan showed thickening of the jejunal loop but was not diagnostic for mesenteric ischemia.

A vascular surgeon evaluated the patient and recommended conservative management with IV fluids and supportive care.

MMC CIAKI Case 1 – **B**ackground 4

Later that evening, the patient developed acute paralysis and bilateral loss of sensation of the lower extremities.

An urgent CT scan with contrast revealed complete occlusion of the abdominal aorta with blood clot from the superior mesenteric artery to the bilateral common iliac arteries.

MMC CIAKI Case 1 – **B**ackground 5

The patient was taken emergently to the OR and underwent aortic thrombectomy.

However, the extent of ischemia to multiple organs was so profound that he developed progressive multi-organ failure and died a few days later.

MMC CIAKI Case 1 – **A**ssessment

Delay in diagnosis of complete occlusion of the abdominal aorta with blood clot from the superior mesenteric artery to the bilateral common iliac arteries is attributed to the patient's death.

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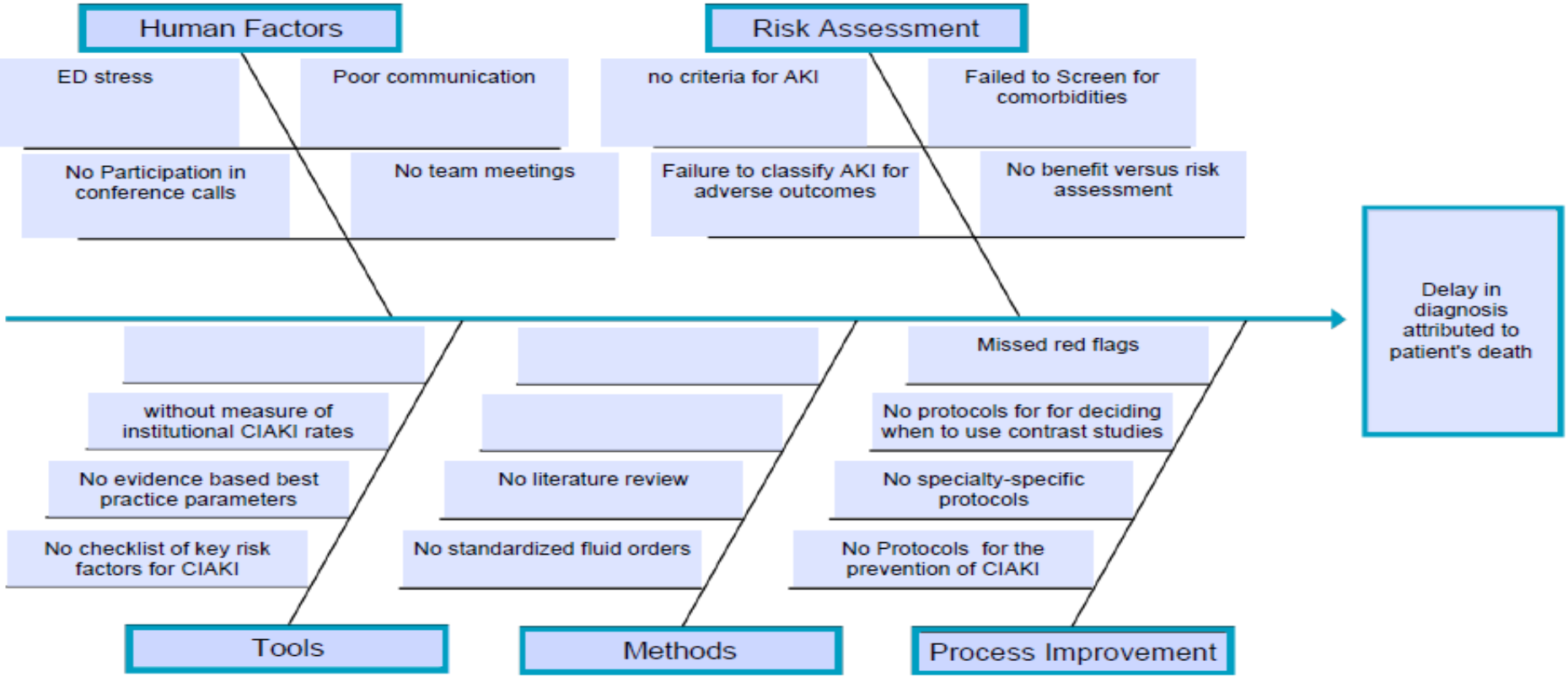
MMC CIAKI Case 1 – **R**eview of the Literature

- Identified potential risk factors related to CIAKI
- Suggests the risk of CIAKI may be overestimated
- Rates may be similar between contrast and non-contrast
- CIAKI is common, permanent kidney damage is fairly rare
- Articles included criteria and classification for AKI that predict adverse outcomes
- Protocols for nephron-protective measures

Case 1 CIAKI: Systems-based Cause and Effect Diagram



MMC CIAKI Case 1 – **R**ecommendations

- Institutions should strongly consider developing risk assessment and standardized protocols.
- Qualitative improvements may include building multidisciplinary teams, educating patients and families about oral hydration.
- Provide IP education collaboration interventions.
- Institute education, methods, tools and measures.

MMC Cord Compression Case 2 – Identify

<u>Cervical Spine Cord Compression</u>

Case is presented by the department chair for the spine division of orthopedics.

Relation to the case is as the assigned auditor 2 weeks ago.

MMC Cord Compression Case 2 – **S**ituation

The patient presented to a new primary care physician and was diagnosed with a peripheral neuropathy (a loss of sensation that typically begins in the hands and feet).

The patient's symptoms were most consistent with a spinal cord process and not a peripheral neuropathy.

The patient is thought to suffer from permanent neurologic loss due to a delay in diagnosis (Betjemann, & Josephson, 2014).

MMC Cord Compression Case 2 – **B**ackground 1

A 54-year-old man with no significant past medical history presented to a new primary care physician complaining of 2 years of progressive bilateral hand and foot paresthesias, pain, and weakness.

Due to these symptoms, he had multiple falls and an inability to grasp simple objects.

MMC Cord Compression Case 2 – **B**ackground 2

- The primary care doctor documented 4/5 weakness in all extremities and a loss of sensation in his hands and feet bilaterally.
- Based on this, the patient was diagnosed with a peripheral neuropathy.
- The patient was referred to see a neurologist sometime in the next 3 months.

MMC Cord Compression Case 2 – **B**ackground 3

Over the next 10 weeks, the patient returned to clinic 2 more times with worsening symptoms, including more frequent falls and new back pain.

He saw two different providers who did not order any additional diagnostic testing assuming his symptoms were due to the previously diagnosed peripheral neuropathy.

MMC Cord Compression Case 2 – **B**ackground 4

- At the neurology clinic, the exam revealed hyper-reflexia and increased tone in all extremities.
- Spinal cord process was suspected and an urgent MRI study of the spinal cord revealed critical cervical (neck) cord compression so tight that it placed the patient at risk for permanent paralysis.
- He was admitted to the hospital and underwent urgent neurosurgical decompression.

MMC Cord Compression Case 2 – **B**ackground

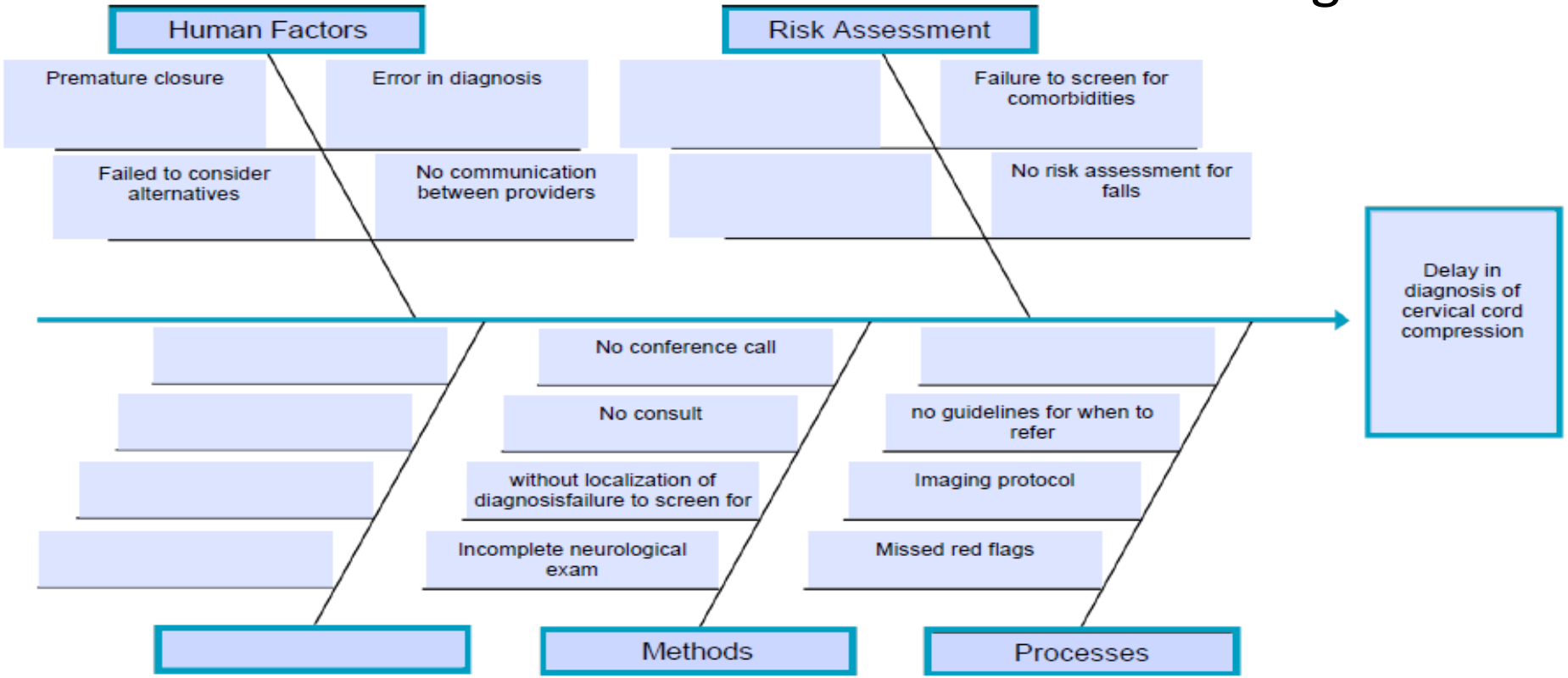
Patient was transferred to a rehabilitation facility.

A delay in diagnosis of cervical cord compression and providing timely surgery is thought to have caused the patient's persistent weakness in his legs and continuing nerve pain.

MMC Cord Compression Case 2 – Literature **R**eview

- Spinal cord compression is a frequently missed neurologic condition.
- Spinal cord compression is the 7th most common diagnosis made by the neurologist.
- Cognitive biases and diagnostic errors are the most common cause of diagnostic error.
- PCPs are likely to be increasingly managing neurologic conditions due to a shortage of neurologists.

Case 2 Cervical Stenosis: Cause and Effect Diagram



MMC Cord Compression Case 2 – **R**ecommendations

- Enhance PCP KSAs with neurologic conditions
- Develop a through and efficient neurologic screening exam
- Cultivate a low threshold environment for neurologic referral among PCP
- Focus on the difference between upper/lower lesions as differential diagnosis
- Improve teamwork with closed-loop IP CC
- Education directed at cognitive biases with diagnosis

MMC Stroke Case 3 – Identify

Thrombotic/Embolic Stroke

Case is presented by the assistant head nurse of the cardiac care unit.

Relation to the case is as the assigned auditor and as the supervisor of nursing care for the patient.

MMC Stroke Case 3 – **S**ituation

The patient presented to the ED and was admitted to a cardiac care unit with the initial diagnosis of an acute hypertension emergency (Barrett, 2014).

During the hospitalization, the patient displayed evidence of embolic stroke and was emergently managed with recombinant tissue plasminogen activator (r-tPA) therapy.

Delay in the time to treatment resulted in the patients discharge with persistent neurologic deficits.

MMC Stroke Case 3 – **B**ackground 1

A 67-year-old male patient with a history of unmanaged hypertension presented to the emergency department (ED) after a fall.

On exam, he was found to have a systolic blood pressure of 220 mm Hg with speech difficulties of undetermined time.

MMC Stroke Case 3 – **B**ackground 2

Laboratory results were remarkable for an elevated troponin of 0.2 µg/L and an elevated creatinine of 1.9 mg/dL (but there was no baseline comparison for the latter).

The ED obtained a CT scan of his brain without contrast before admitting him to the cardiology service with a working diagnosis of hypertensive emergency.

MMC Stroke Case 3 – **B**ackground 3

The head CT demonstrated only extensive white matter hypo-attenuation.

The cardiology team ordered an MRI to further characterize these findings, but the patient was unable to tolerate it due to his altered mental status. Neurology was not formally consulted.

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MMC Stroke Case 3 – **B**ackground 4

Two days into his hospitalization, after spontaneous resolution of his hypertensive emergency and initial neurologic symptoms, the patient became acutely unresponsive and was noted to have new right hand weakness.

MMC Stroke Case 3– **B**ackground 5

A *Code Stroke* was activated and the consulting neurology team examined the patient and found dysarthria, aphasia, right arm and face weakness, and a right homonymous hemianopsia (visual disturbance).

MMC Stroke Case 3 – **B**ackground 6

A brain CT without contrast again demonstrated white matter hypo-attenuation without hemorrhage and after 100 minutes the team administered intravenous rtPA for presumed ischemic stroke.

Within hours, the patient developed new ataxia (incoordination) and nystagmus (involuntary eye movement), prompting an emergent head CT, which demonstrated post-tPA intracerebral hemorrhage.

MMC Stroke Case 3 – **A**ssessment

After careful monitoring and several additional days in the ICU, the patient ultimately was transferred to a rehabilitation facility with moderate persistent neurologic deficits due to a delay in treatment.

MMC Stroke Case 3 – Literature **R**eview 1

- Stroke outcomes are strongly associated with the time to treatment with intravenous rtPA.
- Cerebral, cardiac, or renal dysfunction can also occur in the setting of extreme BP elevations.
- Most EDs are well designed for stroke, but development of inpatient systems are needed for a stroke during hospitalization to overcome challenges with delayed diagnosis and treatment.

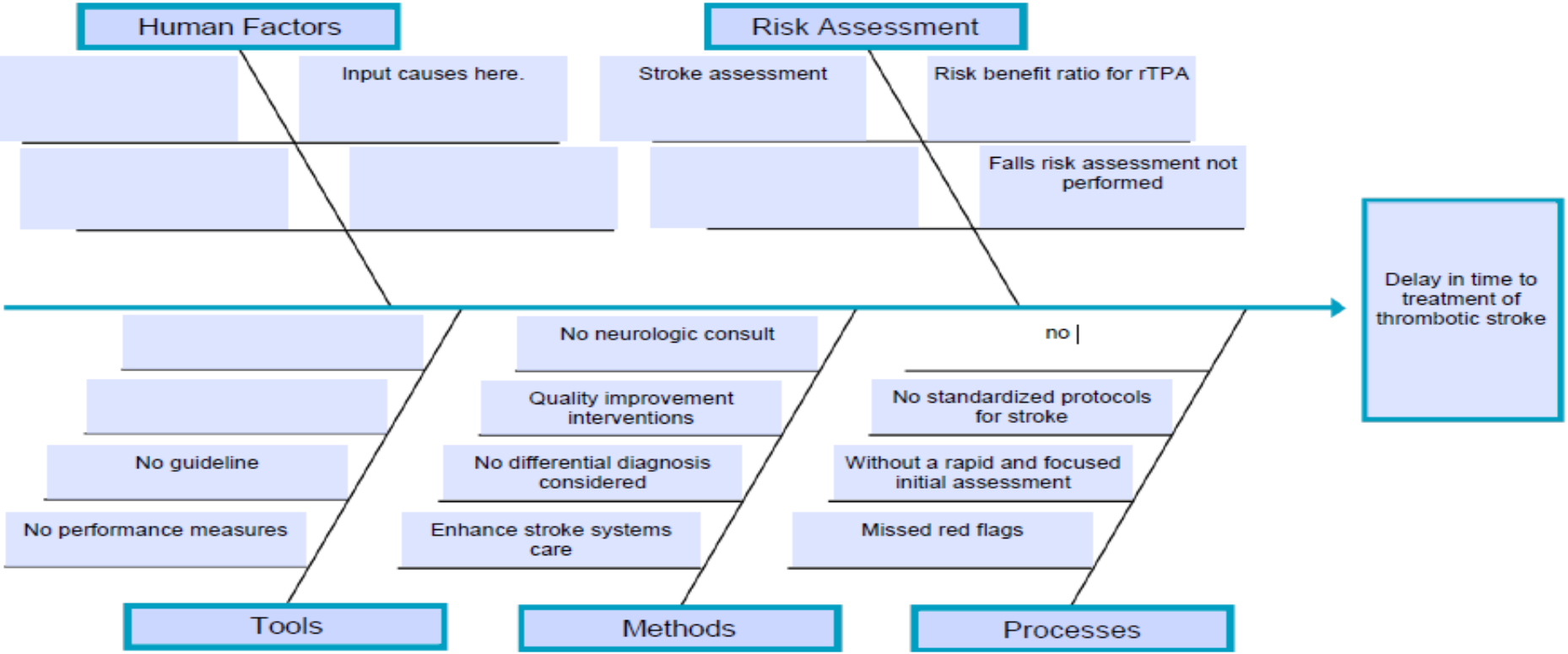
MMC Stroke Case – Literature **R**eview 2

Strategies to streamline care include:

- Pre-hospital notification of acute stroke teams
- Obtaining non-contrast head CT upon ED arrival
- Ready availability of rtPA
- Written protocols for use of intravenous rtPA

The Joint Commission provides certification for standardization in primary stroke centers.

Case 3 Stroke: Delay in Treatment Cause and Effect Diagram



MMC Stroke Case 3: **R**ecommendations

- Adherence to inclusion/exclusion criteria for rTPA is critical to achieve best possible outcomes.
- Standardize and centralize stroke care with rtPA and monitoring on stroke unit.
- Benchmarking metrics each year for quality of care (e.g., database or registry that tracks volume, treatment timelines and outcomes, etc.).
- Adoption of evidence-based practices for stroke.

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