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Goals of Care Discussions for the Imminently Dying Trauma Patient

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Abstract

Background: A structured family meeting (FM) is recommended within 72 h of admission for trauma patients with high risk of mortality or disability. Multidisciplinary FMs (MDFMs) may further facilitate decision-making. We hypothesized that FM within three hospital days (HDs) or MDFM would be associated with increased use of comfort measures.

Materials and methods: We reviewed all adult trauma deaths at an academic level 1 trauma center from December 2014 to December 2017. Death in the first 24 h or on nonsurgical services were excluded. Demographics, injury characteristics, FM characteristics, and outcomes such as length of stay (LOS) were recorded. Early FM was defined as occurring within three HDs; MDFM required attendance by two or more specialty teams.

Results: A total of 177 patients were included. Median LOS was 6 d (interquartile range 4–12). FMs were documented in 166 patients (94%), with 57% occurring early. MDFM occurred in 49 (28%), but usually occurred later (median HD 5 and interquartile range 2–8). Early FM was associated with reduced LOS (5 versus 11 d, $P < 0.001$), ventilator days (4 versus 9 d, $P < 0.001$), and deaths during a code (1.2% versus 13.2%, $P < 0.001$). MDFM was associated with higher use of comfort measures (88% versus 68%, $P < 0.05$). Of patients who transitioned to comfort care status ($n = 130$, 73.4%), code status change occurred earlier if an early FM occurred (5 versus 13 d, $P < 0.001$).

Conclusions: MDFM is associated with increased comfort care measures, whereas early FM is associated with reduced LOS, ventilator days, death during a code, and earlier comfort care transition.

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Keywords

Palliative care; DNR; Goals of care; End of life; Death; Trauma

Introduction

Trauma is a leading cause of death and disability in the United States and is the number one cause of death from age 1 to 46 y.¹ One out of every 10 deaths is trauma related, and many victims are previously healthy.^{2,3} Despite improvements in surgical critical care, mortality and patient suffering remain inevitable.⁴ Patients and families must navigate unexpected life-changing medical decisions, often under high stress and time pressure. Decisions must be made expeditiously to address life-sustaining interventions such as emergent surgical procedures with uncertain mortality and morbidity, blood transfusions, prolonged ventilation, feeding tubes, and the use of cardiopulmonary resuscitation. These decisions are guided by the trauma team and other medical specialists involved in the patient's care.

Guidelines from the American College of Surgeons Trauma Quality Improvement Program recommend a structured family meeting (FM) for trauma patients with high risk of mortality or permanent disability should be performed within 72 h to align care with patient goals and avoid life-sustaining care inconsistent with patient values.^{5,6} Research also suggests that pro-active utilization of multidisciplinary FMs (MDFM), rather than meetings with a single team, may additionally facilitate decision-making by allowing multiple specialists to provide concordant perspectives on prognosis.⁷⁻⁹ Despite the epidemiologic impact of trauma injuries, there are scarce reports on the utilization and types of FMs used by trauma teams for imminently dying patients. It is currently unknown how the timing or composition of staff in FMs with critically ill trauma patients and their families affect the decisions made for patients.

At our institution, no formal protocol on FMs exists, and the timing and participants of FMs are provider dependent. The objectives of this study were to (1) evaluate the performance of goals of care conversations for patients who died from their injury at an established level 1 trauma center using the benchmark of the Trauma Quality Improvement Program guideline, (2) examine factors related to family discussions and code status for patients who died during their trauma admission, and (3) evaluate changes in outcomes for patients who received early FMs and MDFMs. We hypothesized that, for imminently dying trauma patients, occurrence of FM within three hospital days (HD; early FM) or the use of MDFM would be associated with a reduction of invasive procedures, reduced hospital length of stay (LOS), and higher utilization of comfort measures.

Materials and methods

We performed a retrospective analysis of all adult primary patients of the trauma surgery service at an academic level 1 trauma center from December 2014 to December 2017 who died during their index admission. Patients were identified using the institution's trauma registry. Patients who died within 24 h of arrival or who were transferred to nontrauma

services before death were excluded. This protocol was approved by the MetroHealth Medical Center Institutional Review Board, and a waiver of consent was obtained.

Variables

Patient demographics recorded included age, race, and insurance. Disease-specific characteristics recorded included injury mechanism and characteristics including arrival Glasgow Coma Scale (GCS) score, injury severity score (ISS), and abbreviated injury scale (AIS) score. Code status at admission was noted. An FM was defined as any documented discussion between a physician and the patient and/or family addressing prognostication, goals of care, or both. An MDFM required the presence of at least two disciplines, including caregivers from different specialties (typically trauma, neurosurgery, or palliative care), social workers, or chaplains. A single team meeting was defined as an FM that included only one medical team, which could include any medical specialty such as trauma, neurosurgery, orthopedic surgery, or palliative care. Time to first FM and first MDFM were recorded. Early FM was defined as a meeting held within the first three HDs. To account for variable hospital LOS, the time between first FM and death as well as first MDFM and death were also calculated.

Our main outcome of interest was the use of comfort care as the patient's code status at the time of death. In the state of Ohio, there are two tiers of "Do Not Resuscitate" measures. DNR-Comfort Care Arrest (DNR-CCA) institutes comfort measures on cardiac arrest but otherwise allows aggressive measures including surgery, pressor support, and intubation unless a specific directive exists to limit intubation. The second is DNR-Comfort Care (CC), which prioritizes symptom control and limits interventions to those which maximize patient comfort. As a result, we collected code status as Full Code, DNR-CCA, or Comfort Care (CC). Secondary outcomes of interest included LOS, intensive care unit LOS (ICU LOS), and use of a tracheostomy or gastrostomy tube, as proxies for aggressive care.

Statistical analysis

Data are described using medians and interquartile range. Comparisons were made between groups via Wilcoxon rank-sum or Fisher's exact test. Two analyses between groups were performed, based on the hypotheses described previously. The first analysis examined differences between patients who had early FM to those with late or no FM. The second analysis examined patients who had any occurrence of an MDFM to those without MDFM (who had only single-team FMs or no FMs).

Results

A total of 177 patients met inclusion criteria (Table 1). Sixty-eight percent of patients were male; median age was 70 y (interquartile range [IQR] 58–83). Ninety percent of patients were admitted after blunt trauma, including a fall or other accident. Ten percent were admitted after a gunshot wound or assault. The median hospital LOS was 6 d (IQR 4–12), and the median ISS was 26 (IQR 18–32).

FMs were documented in 166 patients (94%) of patients who died (Table 2). FMs were generally held within the first 3 d of hospitalization, and the median HD of the first FM was

Day 2 (IQR 1–5). MDFMs were less frequently documented and were present in 49 patients (38%). MDFM were used later in the hospital stay with median first documented MDFM on HD 5 (IQR 2–8).

Early versus or late or no FMs

An early FM was held in 57% of patients (Table 3). Compared with patients with later or no FM, patients who received an early FM had lower median GCS on arrival (6 *versus* 13, $P < 0.004$), but they did not differ in age, gender, ISS, or AIS-Head. Early FM was associated with reduced hospital LOS (5 *versus* 11 d, $P < 0.001$), ICU LOS (5 *versus* 11 d, $P < 0.001$), ventilator days (4 *versus* 8.5 d, $P < 0.001$), and deaths during a code (1.2% *versus* 13.2%, $P < 0.001$). Among patients who transitioned to comfort care status ($n = 130$, 73.4%), these transitions took place sooner for patients with early FM (5 *versus* 13 d, $P < 0.001$). To eliminate bias from patients with “imminent” death, in whom aggressive measures would be futile, we analyzed an additional subgroup of patients who were hospitalized for three or more days. This subgroup showed similar results.

MDFM versus no MDFM

Comparisons between groups with and without MDFM are presented in Table 4. Twenty-eight percent of patients had at least one MDFM ($n = 49$), 66% of patients had meetings with individual teams only ($n = 117$), and 6% had no documented meetings ($n = 11$). Patients with and without MDFM had similar age, LOS, ICU LOS, ventilator days, ISS, and AIS-Head. At the time of death, 73% of patients were CC, 18% were DNR-CCA, and 9% were full code. Patients with MDFM were more likely to be CC at the time of death (88% *versus* 68%, $P < 0.05$) and less likely to be DNR-CCA (8% *versus* 23%, $P < 0.05$). Patients with an MDFM were more likely to have received a tracheostomy as part of their care (18% *versus* 8%, $P = 0.04$).

Discussion

Despite established guidelines and support in the literature, trauma surgeons failed to perform timely goals of care conversations in more than 40% of patients who died, and a multidisciplinary approach occurred in only 28% of patients. Both early FMs and the use of MDFMs were associated with a reduction in aggressive measures in the dying patient. Earlier timing of the first meeting was associated with fewer deaths during code and reductions in-hospital stay, intensive care, and ventilator use, suggesting that the timing may be important to facilitate a family’s understanding of the critical nature of the situation and allow earlier cessation of aggressive measures.

Multidisciplinary meetings were associated with higher utilization of formal comfort measures, as reflected by comfort care code status at the time of death as opposed to DNR-CCA. This suggests that families may be more accepting of a poor prognosis when teams coordinate their conversations with the families and speak together. Our data suggest that both team structure and timing of meetings are important when making medical decisions for dying patients.

Of our patients who received MDFM, the median time from the first MDFM to death was 1 d. We also noted that patients who received an MDFM were also more likely to undergo tracheostomy and/or gastrostomy placement. In eight of nine patients who received both an MDFM and a tracheostomy or PEG, the MDFM occurred after the procedure. This suggests that the primary providers were using MDFMs when death was imminent rather than when death was possible, leaving very little opportunity for palliative care interventions other than comfort measures. Earlier MDFMs may allow patient families to decide against invasive procedures that have little likelihood of improving overall survival.

Several studies have investigated early palliative interventions in their trauma ICU. Rivet *et al.* from Virginia Commonwealth University performed a retrospective review of 82 patients seen by their palliative service, 50 of which were consulted for comprehensive/end of life issues.¹⁰ Their results mirrored ours, finding that the median time to consultation was 4.5 d and time from consultation to death was 1 d. In this article, trauma surgeons polled suggested that palliative care should be reserved for patients with no remaining treatment options. In our study, 78 patients underwent a therapeutic operation, which we defined as an operation with curative intent, excluding tracheostomy and PEG. We found no significant difference in timing of the FM in these patients. Hospital LOS, ICU LOS, code status, death during code, and timing of FM were also unchanged. We did, however, observe a change in ventilator days from 3.5 to 7 for those undergoing an operation. Our data corroborate the findings of Rivet *et al.*, as trauma surgeons tended to use an organized multidisciplinary meeting to discuss goals of care as a last resort for patients and to facilitate a change in code status to comfort care.

Mosenthal *et al.* presented a prospective, observational, pre-post study of a mandated formal palliative care protocol integrated within their ICU.¹¹ Their procedure required initial family bereavement support and assessment of prognosis and patient preferences on admission followed by an interdisciplinary FM within 72 h to discuss prognosis and goals of care. In this study, they found that documentation of goals of care conversations increased from 4% to 36% of patient days. Similar to our findings, they noted reduced ICU and hospital LOS without any change in final code status or mortality. Although their study demonstrates the benefits of an early and routine palliative care intervention, mandatory integrated palliative care in the trauma ICU with support for all patients may not be practical for all trauma centers because of staffing of these services.

Our study population included only patients who died. We believe, at a minimum, that all patients who died should have had a least one conversation regarding goals of care. Routine, early, goals of care conversations set expectations early for all stake holders and ensures a conversation was held in the event a patient's condition declines. Two patients died suddenly outside of the ICU after a prolonged hospital course. Although these patients had no goals of care conversations as they were ultimately expected to survive, routine use of goals of care conversations might have allowed prior documentation of their wishes in these sudden mortalities. In addition, routine goals of care conversations would allow patients who present in the future with recurrent traumatic injuries or severe acute nontraumatic conditions to have prior documentation of their wishes. Prior data from our institution showed that 17% of trauma patients over the age of 65 y returned with another trauma within 5 y. Patients with

falls had an even higher 25% 5-y recidivism rate.¹² Routine goals of care conversations for these older trauma patients may represent an opportunity for direct, documented, patient participation before a future terminal event.

Our study had several limitations. This study relied on retrospective review of the medical record. FMs were identified by meticulous chart review and included stand-alone notes, documentation within progress notes, and nursing notes. It is possible that meaningful conversations with patients and families were not captured if not documented, but missed conversations were likely related to attending practices rather than patient factors and should not have systematically introduced bias. By selecting for patients who ultimately died, we were unable to review performance and outcomes for patients who ultimately survived. Finally, our study, similar to most of the existing literature, focused on objective factors, which do not fully encompass the benefits of palliative care. We were unable to assess satisfaction and degree of suffering for patients and their families. Surrogates of critically ill or injured patients often have inaccurate expectations on prognosis and treatment plans.¹³ Azoulay *et al.* have presented concerning evidence that family involvement in shared decision-making had a significant increase in posttraumatic stress symptoms when compared with family members learning that the patient had passed.¹⁴ Despite these limitations, our study shows measurable changes in care when early and multidisciplinary discussions are held with families.

Our study supports both routine early goals of care conversation within 72 h and multidisciplinary caregiver involvement for all critically injured trauma patients. Barriers persist for routine use of these strategies despite the growing body of evidence. In our institution, an important barrier to early FMs is provider uncertainty of prognosis. We propose a culture change to perform routine FMs, especially with uncertain prognosis. We believe this will lead to families processing prognostic severity and starting the grieving process earlier, earlier transition to comfort status, more palliative extubations, fewer invasive measures, and lower costs. Further study is warranted to assess these measures, including multicenter prospective trials of early intervention across centers with varying levels of palliative resources and integrative models.^{15,16} Future research should also consider subjective measures including future quality of life in survivors of trauma, functional status, and psychological effects on patients, family members, and care providers.

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Table 1 –

Patients' characteristics.

Characteristic	Total (<i>n</i> = 177)
Demographics	
Age, y (median, IQR)	70 (58–83)
White race, <i>n</i> (%)	172 (97)
Primary insurance type, <i>n</i> (%)	
Medicare	103 (58)
Medicaid/charity/uninsured	28 (16)
Private insurance	15 (8)
Automobile/worker's compensation	28 (16)
Other	3 (2)
Injury characteristics, <i>n</i> (%)	
Mechanism of injury	
Violent (stab, firearm, and assault)	17 (10)
Blunt mechanism	162 (92)
Fall (any height)	702 (58)
Arrival Glasgow Coma Scale score (median, IQR)	10 (3–15)
Injury Severity Score (median, IQR)	26 (18–30)
Abbreviated Injury Scale (AIS) (median, IQR)	
Head	5 (4–5)
Face	1 (1–2)
Neck	2 (2–3)
Thorax	3 (2.5–3)
Abdomen	2.5 (1–4)
Upper extremity	1 (1–2)
Lower extremity	1.5 (1–3)
Code status	
Code status at admission, <i>n</i> (%)	
Full code	160 (90)
Do not resuscitate	15 (8)
Comfort care	2 (1)
Code status at time of death, <i>n</i> (%)	
Full code	14 (8)
Do not resuscitate	33 (19)
Comfort care	130 (73)

n (%) presented unless otherwise noted as median (interquartile range).

Table 2 –

FM characteristics.

FM characteristic	Median (IQR)
Any FM	
FM documented, <i>n</i> (%)	166 (94)
Number of FMs	3 (2–4)
Hospital day of first FM	2 (1–5)
Days between first FM and death	4 (2–7)
MDFM	
MDFM documented, <i>n</i> (%)	49 (38)
Hospital day of first MDFM	5 (2–8)
Days between first MDFM and death	1 (0–4)
Teams/services present at any FM, <i>n</i> (%)	
Trauma	166 (94)
Neurosurgery	44 (25)
Neurocritical care	8 (5)
Palliative care	65 (37)
Orthopedic surgery	3 (2)
Neurology	4 (2)
Chaplain services	8 (5)

n (%) presented unless otherwise noted as median (interquartile range).

Table 3 –

Comparison of early FM versus late or no FM.

Characteristic	Early FM (<i>n</i> = 101)	Late or no FM (<i>n</i> = 76)	<i>P</i> value
Male, <i>n</i> (%)	68 (67)	53 (70)	0.747
Age, y (median, IQR)	70 (55–87)	70 (58–80)	0.527
Violence, <i>n</i> (%)	11 (10.9)	6 (7.9)	0.610
ISS (median, IQR)	26 (22–33)	26 (17–30)	0.177
GCS (median, IQR)	6 (3–14)	13 (3–15)	0.004 *
AIS-Head > 3	71 (70.3)	50 (65.8)	0.625
Ventilator days	4 (3–7)	9 (3–14)	<0.001 *
Hospital LOS	5 (3–7)	11 (7–17)	<0.001 *
ICU LOS	5 (3–8)	11 (6–11)	<0.001 *
Tracheostomy, <i>n</i> (%)	7 (7)	12 (16)	0.06
PEG, <i>n</i> (%)	9 (9)	11 (14)	0.25
Death during code, <i>n</i> (%)	1 (1)	10 (13)	0.001 *
Comfort care code status, <i>n</i> (%)	78 (77)	52 (68)	0.19

* Wilcoxon rank-sum for continuous or Fisher's exact test for categorical variables.

Table 4 –

Patients with MDFM versus no MDFM.

Characteristic	MDFM (<i>n</i> = 49)	No MDFM (<i>n</i> = 128)	<i>P</i> value
Male, <i>n</i> (%)	32 (65)	89 (70)	0.6
Age, y (median, IQR)	69 (51–86)	70 (58–82)	0.9
Violence	3 (6)	14 (11)	0.4
ISS (median, IQR)	26 (22–33)	26 (17–30)	0.1
GCS (median, IQR)	9 (3–14)	10 (3–15)	0.7
AIS-Head > 3	37 (75)	84 (66)	0.2
Ventilator days	5 (2–8)	5 (3–11)	0.7
Hospital LOS	6 (4–11)	7 (4–13)	0.9
ICU LOS	7 (5–10)	6 (4–13)	0.9
Tracheostomy, <i>n</i> (%)	9 (18)	10 (8)	0.04 *
PEG, <i>n</i> (%)	9 (18)	11 (9)	0.1
Death during code, <i>n</i> (%)	2 (4)	9 (7)	0.7
Comfort care code status, <i>n</i> (%)	43 (88)	87 (68)	0.008 *

* Wilcoxon rank-sum for continuous or Fisher's exact test for categorical variables.