



What the Neurosurgeon and the Trauma Team Want to Know: What, Who, When, and Where?

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10.1 Overview

Poor communication causes fragmented care. Important information is often missing during interhospital transfers. Improved, standardised communication during interhospital transfers can close the information gap and improve patient safety and time-critical clinical decisions.

The responsible MD in the neurosurgical unit in the receiving hospital must be given updated, correct, and sufficient information by the Emergency Medical Services (EMS) staff during the clinical handover. This information must build on information gathered by those who had the first contact with the neurotrauma patient or from the local hospital's emergency department (ED) or both. The transfer needs effective communication with concise, rational, clear, and time-efficient exchange of information. The exact and quality-assured patient history and clinical and logistical information should be transferred to the responsible neurosurgeon of the neurosur-

gical unit during the first contact with the referring hospital or the ambulance medical staff.

The information must be documented using a paper form, preferably a standard hand-written checklist type of form or digital format (see the end of this chapter). Updated information should be given by the referring partner or asked for by the receiving neurosurgical unit. This sheet may be copied and used in the neurosurgical unit.

In many emergency medical systems, patient and logistical information is best conveyed via the emergency medical dispatch centre by medically trained dispatchers during a multi-party telephone or radio/telephone conference.

Telemedicine is also an efficient tool in many emergency medical scenarios and will become more relevant also in neurosurgical patient care. Telemedicine solutions are more efficient when combined with web-based 'live' transmission of dynamic numeric and waveform data from a patient-connected multimonitor. More and systematic use of digital medical tools can facilitate timely and precise patient clinical information and safeguard earlier diagnosis and emergency management. Smartphone-based social media clients such as WhatsApp may be the future for even faster and reliable communication of clinical as well as radiological data during on-call neurosurgical referrals. The 'SBAR' (Situation—Background—Assessment—Recommendation) has also been launched as a structured way of communicating information that requires a

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response from the receiver: <http://www.ihl.org/resources/Pages/Tools/SBARToolkit.aspx>.

10.2 What?

Vital Functions: ABC

- Any A, B, or C problem?
- Open airways?
 - Airway adjuncts needed?
 - Suction needed?
- Adequate ventilation?
- Respiratory rate?
- Oxygen saturation?
- EtCO₂?
- Updated blood gases?
- Adequate blood pressure (BP)?
 - BP over last 20–30 minutes?
- External or internal blood losses?
- Ongoing bleeding, not controlled?
- Hypothermia?
- Indications of fractures (extremities, pelvic, spine)?

Current Level of Consciousness and Neurological Status

- GCS score (total and each function score)
 - Current score?
 - Trended scores?
- Signs of herniation
 - Pupillary dilatation (uni- or bilateral)?
 - Extension spasms?
 - Cushing reflex (irregular breathing, bradycardia, hypertension)?
- Any other crude neurological deficit (hemi-, para-, or tetraparesis)?

Other Signs and Symptoms Following Injury

- Vomiting?
- Amnesia (duration)?
- Loss of consciousness following impact (duration)?
- Any focal neurological deficit since the injury?
- Any suspicion of a skull fracture or penetrating head injury?
- Any seizure since the injury?

Injury Mechanism

- High velocity (yes/no)?
- Road traffic accident (RTA)?
 - Car collision?
 - Driver?
 - Passenger?
 - Speed?
 - Roll-over?
 - Ejection from the vehicle?
 - Motorcycle?
 - Speed?
 - Helmet used?
 - More vehicles involved?
 - Bicycle?
 - Other vehicles involved?
 - Helmet used?
 - Pedestrian?
 - Hit by what?
 - Speed?
- Fall?
 - From which height?
- Violence?
 - Blunt blow? By what?
 - Penetrating injuries?
 - Gunshot injury?
- Multitrauma (yes/no)?
 - Any A, B, or C problem?
 - Adequate ventilation?
 - Adequate blood pressure?
 - Hypothermia?
 - External/internal blood loss?
 - Indications of fractures (extremities, pelvic, spine)?
- Hypothermia prevention started?
- Current core temperature?
- Any indication of a neck injury?
 - Para- or tetraparalyses?
 - Localised neck pain?
 - Is the neck stabilised before the transport?
- Is the patient otherwise stable for transport?
 - If not, what needs to be done and where?

Radiological Examinations

- Radiological examinations performed and findings?
- Can emergency CT or MRI-images be transferred via telemedical systems?

10.3 Who?

Name
Age
Gender

Previous medical conditions? Intoxication?

- Any history of bleeding or clotting disorders?
- Anticoagulant medication now (yes/no)?
 - Type of anticoagulation medication?
 - Antidote available?
 - If warfarin, last INR value?
- Hydrocephalus with CSF shunt (yes/no)?
- Actual alcohol or drug intoxication?
- Other?

10.4 When?

- Approximate time of accident?
- Time of contact with the neurosurgical unit?
- Estimated exact time of arrival at the neurosurgical unit?
- Potential delays (weather, capacity, other potential delays)?

10.5 Where?

- Site of accident?
- Weather (hypothermia)?

10.6 Logistics?

Present Location, Transport, and Professional Companion to the Neurosurgical Unit?

- Is the patient in a hospital or in an ambulance?
- Professional capacity of ambulance unit?
 - Emergency physician present?
 - Paramedic?
 - Airway management expertise?
 - Endotracheal intubation?
 - Supraglottic airway?
- Established treatment and monitoring?
 - IV line(s)?
 - Intraosseous line(s)?
 - Pulse oximetry with SatO₂?
 - Repeated non-invasive blood pressure measurement (NIBP)? Intra-arterial line with intra-arterial blood pressure (IABP)?
 - ECG?
 - Capnography with end-tidal CO₂ (Et CO₂)?
 - Body temperature?
 - Anti-oedema treatment given (mannitol, hyperventilation)?
 - Blood transfusions given?
 - Damage control surgery performed at local hospital?
- Telemetry and telemedicine possibilities?
 - Live transfer of ongoing patient monitoring?
 - Digital transfer of diagnostic imaging (CT, MRI)?
 - Videoconferencing from local hospital?

Appendix

Neurotrauma emergency sheet

Name:	Gender: M/F
Date of birth:	Date and time of first contact:
What?	
<i>Vital functions—ABC:</i>	
• Any A, B, or C problem:	Yes_/ No_/
• Open airways:	Yes_/ No_/
• Adequate ventilation:	Yes_/ No_/
• Adequate blood pressure:	Yes_/ No_/
• External or internal blood losses:	Yes_/ No_/
• Fractures (extremities, pelvic, spine):	Yes_/ No_/

(continued)

Neurotrauma emergency sheet				
<i>Current level of consciousness and neurological status:</i>				
GCS score (total and each category):	Total:	E:	M:	V:
Herniation:				
• Unilateral pupillary dilatation:	Yes_/	No_/		
• Bilateral pupillary dilatation:	Yes_/	No_/		
• Extension spasms:	Yes_/	No_/		
Any other coarse neurological deficit:	Yes_/	No_/		
• If yes, what?				
Injury mechanism:				
• High velocity:	Yes_/	No_/		
• Multitrauma:	Yes_/	No_/		
• Road traffic accident (RTA):	Yes_/	No_/		
• Car collision:	Yes_/	No_/		
• Motorcycle:	Yes_/	No_/		
• Bicycle:	Yes_/	No_/		
• Pedestrian:	Yes_/	No_/		
• Fall:	Yes_/	No_/		
• From which height:				
• Other injury mechanisms—what?				
• Neck stabilised before the transport?				
• Patient otherwise stable for transport?				
• If not, what needs to be done and where?				
<i>Radiological examinations:</i>				
• Radiological examinations performed and findings:				
• Can emergency radiology be transferred via telemedical systems?				
When?				
• Approximate time of accident:				
• Time of contact with the neurosurgical unit:				
• Estimated time of arrival at the neurosurgical unit:				
Where?				
• Site of accident:				
Logistics:				
Present location, transport, and professional companion to the neurosurgical unit:				
• Patient in hospital or ambulance:				
• Professional capacity of ambulance unit:				
• Emergency physician present:				
• Paramedic:				
• Anti-oedema treatment given (mannitol, hyperventilation):				

Suggested Reading

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