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# Turin Emergency Medical Service Nurse: Which End-of-Life Decisions?

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## 1. Abstract

**Introduction:** 118 Turin EMS emergency nurses often work as team leaders on the ambulance and sometimes find themselves in the conditions of having to decide whether to resuscitate and if to interrupt the resuscitation of patient's victims of out-of-hospital cardiac arrest (OHCA). This study aims to evaluate the OHCA patients managing and end-of-life decisions by emergency nurses on MSAB of the 118 Turin EMS.

**Materials and Methods:** A semi-structured questionnaire was created and distributed anonymously to 109 nurses working without physician on ambulances in order to investigate end-of-life decisions through questions aimed to explore the most aspects of OHCA management.

**Results:** The questionnaire was completed by 62 (57%) nurses; 98% (61) are certified Advanced Life Support. On average, nurses report each one 2 OHCA per month managed in autonomy. Features that most influence resuscitation decision are end of-life cancer pathology (95%, 58), witnessed arrest (82%, 50), BLS in progress (70%, 43), severe disability/bedridden (66%, 40) and OHCA occurred less than 10 minutes (64%, 39). For 65% (40) anxiety is limited during OHCA management but legal protection is perceived inadequate.

**Discussion:** The features influence revive decision appear mostly in line with literature. Emergency nurses appear experienced and trained; nevertheless, uniform behaviour in end-of-life decision is not always observed. The national legislation and the literature concerning the end-of-life decisions by "non-medical" is mostly unclear; therefore, nurses would like standardized protocols (58%) and comparison with relatives (85%) and with physician by phone (92%).

**Conclusion:** Turin EMS emergency nurses sometimes take end-of-life decisions; however,

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protocols and training courses on legal and bioethical aspects would be needed or improved.

**2. Keywords:** Out-of-Hospital Cardiac Arrest; Emergency Nurse; Adult; Italy; Prehospital; EMS, Resuscitation, End-of-Life Decision.

**3. Introduction** In the 118 Turin EMS the response phase is base in three-tier system, in agreement of the code made by the telephone evaluation based on protocols.

Therefore, there are 22 Advanced Life Support (ALS) ambulances (called MSA), with a team consisting of an emergency physician, an emergency nurse and two emergency medical technicians (EMT), for red and yellow codes. The second tier is made up of 7 MSAB, with a crew of one emergency nurse, who acts as team leader, who is supported by two EMTs and manages mainly yellow and red codes but also sometime green codes.

In addition to these types of team there are also 30 Basic Life Support Ambulances (called MSB), where the crew members are two or three EMT qualified to perform BLSD, mainly for green and white codes, but also for yellow and red codes in absence of MSA and MSAB.

In this context, there are 149 emergency nurses operating on MSA and MSAB ambulances, divided into 7 operating ambulance stations deploy in the city and in the county of Turin, according to geographical and population criteria, to serve around 2.3 million inhabitants.

Among these 149 emergency nurses, 109 of them also have the opportunity to work on MSAB. To perform these tasks, nurses preferably take two certification courses: ALS, according to the European Resuscitation Council (ERC), and the "ABCD Course" organized by EMS 118 of Turin, which concerns the evaluation and treatment of cardiorespiratory conditions, obstetrics and gynecological disease, pediatric diseases, and the management of trauma.

Emergency nurses who operate independently do not have protocols that make treatment for patients systematic, however medications are often administered by international guidelines and sometimes prescribed by phone by the physician in charge of the Dispatch Center of the EMS.

The most common emergency medications are available on MSAB, excepted for opioids, propofol and muscle relaxant, such as succinylcholine.

Sometimes emergency nurses on MSAB manage situations of OHCA: they have to decide whether to start or not ALS, and also, if they start, until when to continue it. Italian law provides that "death certificate" is a medical act.

However, it is a consolidated practice that MSAB's emergency nurses, once she/he think to stopped ALS, contact the physician in charge of the Dispatch Center of the EMS. Therefore, in agreement of the physician stopped the CPR, and perform an electrocardiogram (EKG) which certifies asystole. Subsequently, MSAB's nurse has to entrust the patient to the family or to law enforcement, waiting for General Practitioner (GP), who will draft the death certificate. In addition to this law, there are no other precise indications by the Italian rule that regulates these situations.

This practice, without a univocal local standardized protocol, involves a complex context of bioethical, legislative, jurisprudential and deontological implications

Likewise, 2015 A.L.S. Guidelines [1] do not give clear statements about any clinical cases, indicating that end-of-life decisions should be taken by the most experienced professional of the team and that the presence of any patient's living will (such as DNAR) must be assessed. Furthermore, the same guidelines prompt to refrain from resuscitation in those cases where the patient's quality of life is not guaranteed [2,3] or in cases of certain death such as bedridden, rigor mortis, beheading and other similar

situations [1]. Many studies [4,5,6,7] identify event and patients past medical history useful for termination of resuscitation (TOR) decision making or to continue resuscitation efforts. The elements in favor to TOR common to different studies and contexts are: not witnessed by rescuers or by bystanders event, non-shockable rhythms at the first heart rhythm analysis (asystole or PEA), the impossibility of delivering at least one shock and therefore the permanence of non-shockable rhythms; the last one element is the failure to return of spontaneous circulation (ROSC) within 20 minutes resuscitation efforts in the absence of heart rhythm changes.

It is important to emphasize that the decision is made whether to start or discontinue CPR is usually more challenging outside hospital [1].

This study aims to evaluate the OHCA patients managing and end-of-life decisions by emergency nurses on MSAB of the 118 Turin EMS.

## 4. Materials and Methods

A descriptive qualitative-quantitative study was carried out. A questionnaire was created, consisting of 25 MCQ, open questions and Likert scale to evaluate:

- The demographics, education degree, courses and training in prehospital emergency medicine and the EMS experience;
- MSAB's shifts per month and the average of OHCA's number managed on MSAB per month;
- Factors that influence the decision to start or stop resuscitation;
- Communication with physician in charge of EMS Dispatch Center and legal protection perceived both in treatment of critical condition patients and in O.H.C.A. management when nurses act without physician support;
- Four O.H.C.A. scenario with related end-of-life decisions, which were useful to confirm the prospects offered by the targeted questions. Proposed scenarios, were created specifically on the basis of authors common experience and due to the absence of similar proposals in the literature; scenarios are the following:

  - O.H.C.A. situation occurred in an 87-year-old man with moderate quality of life, found in asystole; one MCQ has been formulated in this case.
  - O.H.C.A. occurred in a man under 70-year-old, with an insignificant past medical history, collapsed about 8 minutes before; three MCQs and one open question have been formulated in this case.
  - O.H.C.A. situation occurred in 84-year-old women with several comorbidities (type 2 D.M., senile dementia, cardiomyopathy with I.C.D., osteoporosis with previous femur fracture 9 months before), in asystole at ambulance arrival; BLS was not performed by relatives and they witness event about 10 to 15 minutes before; one MCQ has been formulated in this case.
  - O.H.C.A. situation occurred in a patient of about 30 years, victim of motorcycle accident with high kinetic energy and found in asystole at first analysis; one MCQ has been formulated in this case.

The study was carried out on a population of 109 (100%) Turin EMS nurses sorted according following criteria:

- Inclusion criteria: Turin EMS nurses which can carry out shifts on MSAB

The study took place in the period between January and August 2019; the questionnaires were delivered between June and July 2019.

Data obtained from quantitative variables are therefore analyzed by means of frequencies, percentages, mode, averages, medians and ranges; answers from open question were analyzed by grouping keywords.

## 5. Results

The questionnaire was completed by 62 nurses (57%), 50% of whom are female; average age is 45 years (range: 34-56 years). 55% of the group has a

Bachelor of Science in Nursing (55%, 34) and 32% (20) has Regional Certification. The 98% is in possession of ALS certification by ERC and the 88% attended "ABCD Course" organized by Turin EMS Department.

Emergency nurses are employed in EMS for an average of 14 years (range: 2-26 years); 52% (32) of nurses work at least 38% of their shifts per month on MSAB, during which they manage an average of 2 OHCA per month (range:1-5/month).

According to literature and guidelines analyzed, the questionnaire asked which characteristics could influence the decision made by the emergency nurse when they have to decide whether to start and until when to continue or not to undertake resuscitation. For this question, 13 variables were proposed on which the possibility was given of answering "yes", "no" or "depends" for each one of variable.

The variables that most influence end-of-life decisions made by EMS nurses which act without physician, are:

- ALS beginning less than 10 minutes from the event (64%, 39),
- BLS or BLSD performed by bystanders (70%, 43) or by EMT (70%, 43),
- OHCA event witnessed by bystanders (82%, 50),
- End-of-life cancer pathology (95%, 58),
- Severe comorbidities, such as (50%, 31), CAD, cardiomyopathy, type 1 or type 2 DM, heart failure, hypertension, COPD, chronic renal failure, atrial fibrillation, liver disease, neurodegenerative diseases and many others like these,
- Bedridden and/or severe disability (66%, 40).

In open question, related to previous query, 52 (84%) nurses answered; 44% (23) of these nurses assert the relevance of evaluation of "family compliance" in order to make the decision to revive or not; for the same purpose, the usefulness of a "global anamnestic assessment" was reported by 38% (20); similarly, 31% (16) consider relevant to reflect on “operative context and environment". Finally, 21% (11) believe it is important “take patient age into consideration” and to guarantee “patient dignity” (15%, 8). Finally, 12% (6) underline taking into consideration the possible presence of living will.

In order to investigate nurses' knowledge in difference between an oncological patient and an end-of-life cancer patient, the possibility of providing a short description has been proposed. 58 (94%) of responding nurses, as regards the cancer patient, outlined a subject with "malignancy diagnosis" (92%, 57) with an "uncertain prognosis" (34%, 20) and an "ongoing treatment and therapy process" (34%, 20); with regard to this type of patient, only one nurse (1%, 1) said that this type of patient had "started palliative care".

On the other hand, with regard to description of an end-of-life cancer patient, nurses affirm that it is a patient with “poor prognosis” (59%, 35), in "palliative care” and with “support therapy" (56%, 33), with a “short life expectancy” (22%, 13), “poor quality of life” (16%, 10) and with “metastasis” (8%, 5).

Then the questionnaire aims to know if OCHA caused by a severe trauma could change the nurse decision: 53% (33) of them affirmed they are influenced in some way by this cause. In the relative open question it was also stated in 58% (19) that "in an OHCA caused by a trauma, ROSC chances are very low”, while 55% (18) also cite “the importance of injuries not compatible with life”; 9% (3) then claimed to “evaluate the context, dynamics and kinematics” and still 6% (2) indicate that “the Guidelines do not indicate the beginning of the ALS in OHCA caused by a trauma”.

Nurses were asked, then, if there is a time after which they believe it may be futile to resuscitate in

the absence of BLS or BLSD already started; the result shows that nurses consider this timing in around 10 minutes (36, 58%). Other nurses (15%) give no answer, 11% indicate as time 15 minutes, 10% suggests 20 minutes, while the remaining 6% indicate other minutes.

These statements were mostly explained for the "irreversible anoxic damage" (74%), while according to other 10 opinions (19%) for the "multi-organ hypoxic damage".

In the following part of the questionnaire, questions concern organizational, logistical and medicolegal issue. First of all, it was requested after how long, according to emergency nurses perceptions, the ambulance reaches the target of the intervention; it has been deduced that in 63% of cases it arrives in a time not exceeding 10 minutes, in 31% of cases between 10 and 20 minutes and in 6% of the missions more than 20 minutes are needed; these timescales have not been specifically associated with the urban or suburban environment.

Later, the questions focused on the relationship between the nurses and the physician in charge of the EMS Dispatch Center. First of all, it was asked to indicate whether the compiler had ever requested a consultation from this doctor to decide whether to start resuscitation; 53% (33) replied that it happened at least once, explained these cases by 25% (8) of the subjects in case of "unclear situation, even for past medical history"; other elements that lead to the comparison whit the physician are just like "poor family compliance" (19%, 6), "OHCA event timing more than 10 minutes" (19%, 6) or "medicolegal reasons" (16%, 5); finally, 5 (16%) nurses asserted they always contact the physician in charge of the EMS Dispatch Center. To complete this request, therefore, it was asked how it is considered important by the nurses to consult with the physician in charge of the EMS Dispatch Center in order to stop the ALS once undertaken; it followed that, on a Likert scale from 1 to 10, results a modal value of 10 in a range from 1 to 10.

Emergency nurses were asked if OHCA managing as the only one Health Professional could be an anxiety moment; the result is, on a Likert scale from 1 to 10, a modal value of 1 (range: 1 to 10) and a single value of 10 was also found.

Finally, questionnaire wondered if the nurses felt protected on legal aspect in OHCA management on MSAB; on the basis of the proposed Likert scale from 1 to 10, results a mode of 1 in a range from 1 to 10 whit only a value of 10.

In the following section of the questionnaire, clinical scenarios, were proposed; in the first case 45% (28) of nurses would have started resuscitation, while the rest were divided between "Depends" (22, 35%) and "No" (11, 18%). 46 open responses were also collected, in which 35% (16) said that "ALS is attempted if there are no rigor mortis and/or hypostatic spots", while 12 nurses (26%) reported instead that a "family compliance assessment" is necessary.

More questions were asked within the second clinical case. First of all, it was asked whether or not nurses would start resuscitation: 98% (61) would certainly start it, while 2% (1) replied that "choice should be made based on relatives wishes". It was therefore requested to indicate an expected duration of this resuscitation attempt: it appeared that 26 nurses (42%) identified the time in 30 minutes, 24 (39%) indicated 20 minutes as timing, 6 (10%) suggest 40 minutes, 4 (7%) did not respond; finally 1 subject (1%) designated timing in 45 minutes and 1 (1%) in 50 minutes.

The subsequent question regarding the same clinical case asked if, before stopping the resuscitation, nurse would contact physician in charge of the EMS Dispatch Center by phone; it resulted that 58 subjects (94%) replied "Yes" as they would consult him, while 4 (6%) replied "No", as they would not

consult him.

Finally, was wondered for this circumstance about the possible request for MSA ambulance that implicitly meaning a physician support; 39 nurses (63%) replied “Yes”, conversely 23 (37%) replied “No”.

In the third scenario proposed 53% (33) of nurses indicated that “resuscitation is not started but physician in charge of the EMS Dispatch Center is contacted by phone for consent to not perform ALS”, while 27% (17) indicated that “ALS is performed for the first 20 minutes, after which, if there are any rhythm changes, according to physician in charge of the EMS Dispatch Center, ALS is discontinued”. Finally, 15% (9) chose “ALS is started making arrangements with physician in charge of the EMS Dispatch Center if is appropriate continue and until”. Within the “Other" response for this clinical case, chosen by 2 nurses (3%), 1 nurse reported in open answer “assessing the situation with the family members” while 1 subject wrote “it depends on relatives will”.

In the last one proposed clinical scenario, 73% of the nurses replied that ALS would begin, while 24% of nurses would not perform resuscitation. In particular, in 53% of cases (33 subjects) it was suggested that “resuscitation is performed without interruption until MSA arrival”; 24% of nurses (15) answers that “resuscitation is not started according to physician in charge of the EMS Dispatch Center". In "Other" response, chosen by 2 nurses (4%), both wrote that “it depends on context and the dynamics of the crash”.

It is necessary to add, for completeness, that 8 nurses (13%) wanted to underline that the patient in the clinical case is a "potential organ donor", because in Piedmont Region there is no organ donation protocol.

## 6. Discussion

The results offer a fairly complete view of the relationship between emergency nurses operating on Turin MSAB and OHCA management for which, on some occasions, nurses find themselves making decisive choices for the patient's life. From the overall data analysis, it can be noted that emergency nurses do not always take unique choices for the same patient. Is evident that answers of a same nurse may change within the questionnaire if is exposed a clinical scenario that is a more realistic situation.

However though, from the study emerges a reality that can be comparable with literature. First of all, emergency nurses have proven to be experts in emergency area particularly in EMS, in which they are employed for an average of 14 years; they are also trained on OHCA management according to ALS Guideline by ERC (98%).

In addition to training, experience is considered a significant factor in the literature for making decision whether to start and/or suspend resuscitation; Advanced Life Support 2015 Course Manual [8], maintains that “overall responsibility for this decision lies with expert healthcare professional”. Nevertheless, it can also be remembered that study’s nurses are frequently employed on MSAB, for an average of 40% of their monthly shifts, during which they manage an average of 2 OHCA per month.

Elements identified as decisive in order to make end-of-life decisions have proven to be mostly in line with international literature [4,5,6,7]; among the factors that have greatest influence on resuscitation decision there are mainly the event witnessed (82%) and the resuscitation effort (BLS or BLSD) already started by bystanders, before MSAB arrive.

Another element (predictor) that emerged is OHCA occurred for less than 10 minutes, which represents a crucial factor in favor of resuscitation, always or depending on other factors, for 85% of emergency nurses. On the other hand, if time is more than 10 minutes, the amount of those who are always

influenced by this factor drops to 34% and many (49%) indicate a dependence of this element in relation to others to be considered.

These data must also be interpreted in relation to a time beyond which, in case of OHCA it is considered futile to start ALS at MSAB arrival. The result was that 58% replied just 10 minutes, motivating it in 74% of cases for the "irreversible anoxic brain damage". This appears to be in accordance with timing indicated by the literature, which suggests the beginning of hypoxic brain damage, already after the third minute of cardiorespiratory arrest without CPR [9]. Similarly, it is also known that "every minute that passes between the appearance of cardiac arrest and defibrillation, mortality increases by 10-12%" [10]; so, at the tenth minute of cardiac arrest the probability of this event proving to be fatal is about 100%. In addition, the 2015 ALS Guideline argue that the intervention must start as soon as possible since the longer the time since the beginning of the resuscitation, the less hope there is for an ROSC [11], [12], [13], [14], [15].

Among other elements emerged, regarding non-shockable rhythm and therefore the lack of possibility to deliver at least one shock with the defibrillator, the nurses expressed in 59% of the cases of being influenced at the decision moment of continuing or suspending resuscitation. These timings are also to be correlated with what the nurses declared regarding the arrival times of ambulances on the target; these times appeared in line with Italian Health Ministry Guideline [16], that requires within 8 minutes for the urban area and 20 minutes for the suburban area the ambulance arrival on target. In fact, in 62% of cases target is reached in less than 10 minutes from call and only in 6% of cases does it take more than 20 minutes to reach target.

Other characteristics that influence the decision not to resuscitate is the known end-of-life cancer pathology (95%, 58), a serious disability and/or bedridden condition (66%, 40) and patient with serious multi-pathological past medical history (50%, 31).

This aspect must be considered even more exhaustively considering that, with regard to the non-end-of-life cancer patient, the result is reversed as 84% (51) of the sample declares they are not influenced from this, totally or in dependence to other elements.

This figure appears to be related to Guidelines which indicate in the resuscitation a different management for end-of-life patients. 2015 ALS Guideline by ERC states that it is commonly considered valid to refrain from aggressive and extraordinary interventions-such as CPR-in the terminal stages of end-of-life pathology, when death appears inevitable and the treatments would cause only a precarious and painful life extension [1]. Furthermore, the same Guideline suggests refraining from resuscitation if can be considered futile, or if resuscitation would not prolong life with a quality that could be considered acceptable [1]. It is then important to correlate these statements with what was claimed by nurses regarding the definition of end-of-life cancer patient, described as a patient with a "diagnosis of malignancy" "with poor prognosis", in "palliative care and/or supportive care" and with "short life expectancy".

Finally, phone contact with the physician in charge of the EMS Dispatch Center is considered important when emergency nurses have to decide to stop resuscitation, however, only 53% (33) of them happened, at least once, to discuss with physician to choose whether to start the ALS. It is therefore clear that these two occasions are perceived by nurses as not at all similar moments, but two different clinical moments.

These results, about phone contact as soon as an help

in decision making process for emergency nurses, can be explained by the fact that, in Turin 118 EMS reality, there is no formal obligation for the nurses of MSAB to contact the physician if they decide not to start or continue resuscitation according to they own judgment. However, a common practice appears for 94% (58) of the sample, which can probably be explained from both clinical but also medicolegal reasons.

This wide possibility of choice explains, together with the lack of operating procedures, of the inadequate legal protection that is perceived by emergency nurses, which, however, do not feel particular anxiety in OHCA management.

Since the study was qualitative, the statistical analyzes performed cannot be considered statistically significant; in addition, the percentages were calculated on the basis of those who answered each question.

The major limitations of the study can be identified in the sample size (109 subjects) and in questionnaire written form that did not allow to grasp more nuances and personal interpretations of situations.

Furthermore, an open question was not formulated that would allow to tell a case of free choice by the compilers. Finally, different types of data would need to be taken directly from the medical reports, in order to be able to obtain as impartial information as possible but authorization was denied.

## 7. Conclusion

Turin E.M.S. emergency nurses often make end-of-life decisions without a physician. In accordance with what was expressed in the questionnaire, it would be fundamental to introduce specific training on both forensic and bioethical subjects. It is known in the literature [16,17] that is fundamental for health care professionals who faced with cardiac arrest situations and for whom they must make decisive choices for patients, in order, first of all, to respect the patient in his dignity and in his/her will, especially where DNAR is not found, a common situation in Italy.

It would also be useful to evaluate the introduction operative protocols created by the EMS Department in order to make the procedures and behaviors adopted by nurses, living in the field these difficult situations, more uniform.

Further studies would therefore be needed on this topic, which is widely debated currently; it would be useful to consider conducting a multicenter study that takes into consideration different organizational realities, which are united by the autonomous presence of the emergency nurse on ambulances.

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