

## SPECIAL ARTICLE

## CARDIOPULMONARY RESUSCITATION ON TELEVISION

## Miracles and Misinformation

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**Abstract Background.** Responsible, shared decision making on the part of physicians and patients about the potential use of cardiopulmonary resuscitation (CPR) requires patients who are educated about the procedure's risks and benefits. Television is an important source of information about CPR for patients. We analyzed how three popular television programs depict CPR.

**Methods.** We watched all the episodes of the television programs *ER* and *Chicago Hope* during the 1994–1995 viewing season and 50 consecutive episodes of *Rescue 911* broadcast over a three-month period in 1995. We identified all occurrences of CPR in each episode and recorded the causes of cardiac arrest, the identifiable demographic characteristics of the patients, the underlying illnesses, and the outcomes.

**Results.** There were 60 occurrences of CPR in the 97 television episodes — 31 on *ER*, 11 on *Chicago Hope*,

and 18 on *Rescue 911*. In the majority of cases, cardiac arrest was caused by trauma; only 28 percent were due to primary cardiac causes. Sixty-five percent of the cardiac arrests occurred in children, teenagers, or young adults. Seventy-five percent of the patients survived the immediate arrest, and 67 percent appeared to have survived to hospital discharge.

**Conclusions.** The survival rates in our study are significantly higher than the most optimistic survival rates in the medical literature, and the portrayal of CPR on television may lead the viewing public to have an unrealistic impression of CPR and its chances for success. Physicians discussing the use of CPR with patients and families should be aware of the images of CPR depicted on television and the misperceptions these images may foster. (N Engl J Med 1996;334:1578-82.)

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IN critical care units and hospital wards across the country, patients and physicians struggle with decisions about whether or not to undertake cardiopulmonary resuscitation (CPR) and other potentially life-sustaining treatment. Often, these decisions are not made on a sound basis. Doctors are frequently unaware of their patients' wishes concerning treatment.<sup>1</sup> Even when physicians are aware, they may find the patients' requests problematic. Ideally, decisions about the prospective use of CPR should be made jointly by the patients and physicians,<sup>2</sup> but for patients to participate in medical decisions, they must be informed about the risks and benefits of a procedure and must incorporate this knowledge into the choices they make.

Patients learn about CPR from many sources, including physicians, family and friends, personal experience, and CPR courses. In a number of studies, however, patients report that they obtain much of their information from the media. For example, Schonwetter et al. found that 92 percent of patients over 62 years of age reported obtaining information about CPR from television, 82 percent from newspapers, and 72 percent from books.<sup>3</sup> In another study, 70 percent of the patients over 74 years of age reported obtaining information about CPR from television.<sup>4</sup> Furthermore, patients often overestimate their likelihood of survival after CPR,<sup>3,5</sup> and this

misinformation may lead them to choose to undergo resuscitation in situations in which survival is extremely unlikely.<sup>3,5</sup>

Since television is an important source of information about CPR for patients, we analyzed how three popular medical programs depict CPR. We wanted to see how patients undergoing CPR on television compared with such patients in the real world, and to compare the survival rates after CPR on television with the survival rates reported in the medical literature.

## METHODS

## Study Design

We viewed all the episodes of the television programs *ER* and *Chicago Hope* during the 1994–1995 viewing season and 50 consecutive episodes of *Rescue 911* broadcast over a three-month period in 1995. The first two programs are fictional dramas set in hospitals; *Rescue 911* shows dramatic reenactments of actual rescues by emergency services throughout the country.

We identified all the occurrences of CPR in each episode. CPR was defined as any situation in which chest compressions were performed on a patient, a patient was said to be having "an arrest," or an unconscious patient was defibrillated for ventricular fibrillation or ventricular tachycardia. We included only instances of arrhythmia identified verbally by one of the characters or clearly observed on a cardiac monitor.

For each occurrence of CPR, we recorded the following information: the patient's sex and age, the patient's location at the time of cardiac arrest (in or out of a hospital), whether the arrest was witnessed, whether CPR was performed by a bystander, the immediate cause of the arrest, and any known underlying illnesses of the patient. We noted the use of chest compressions, rescue breathing, defibrillation, and open cardiac massage during the resuscitation. We recorded whether the patient survived the arrest, whether he or she survived to discharge from the hospital, and the long-term outcome. In addition, if physicians on the programs offered estimates of a patient's chance of survival after CPR, we noted those estimates.

We also documented all deaths that occurred on the programs, re-

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ardless of whether the patient received CPR, and we noted the patient's age and sex, the patient's location at the time of death, and the cause of death. We recorded whether CPR was attempted and whether the death was seen in the program or only referred to by other characters.

To validate our coding methods, two investigators, both board-certified internists, reviewed the first 10 episodes in our series (4 of *Rescue 911*, 3 of *ER*, and 3 of *Chicago Hope*). Each observer was blinded to the other's findings. Since the observers agreed perfectly on their identification of occurrences of CPR, their identification of survivors of CPR, and their estimates of the patients' ages, only one observer rated all subsequent episodes.

### Statistical Analysis

Short-term success of CPR is usually defined as the return of the patient's blood pressure and pulse for one hour. Long-term success denotes survival until discharge from the hospital. Rates of short-term survival vary depending on the patient's age, the cause of arrest, co-existing illnesses, the cardiac rhythm at the time of the arrest, and the geographic location. A short-term success rate of 40 percent is the upper limit reported in the literature.<sup>6-19</sup> Reported rates of long-term survival vary from 2 percent to 30 percent for cardiac arrests taking place outside a hospital and from 6.5 percent to 15 percent for arrests inside a hospital.<sup>6-19</sup>

We compared the rates of long-term and short-term success for the occurrences of CPR seen in the television programs with the respective rates derived from all relevant studies in the medical literature. To calculate the sample size necessary for the study to have an 80 percent power of detecting a 20 percent difference between the survival rates seen on television and those in the literature (with an alpha level of 0.05 in a two-sided t-test), we used the highest reported long-term survival rate in the literature, 30 percent. Under these assumptions we needed a sample of at least 43 observed instances of cardiac arrest.

Rates of survival were calculated for each television series separately and for all three combined. The survival rates for all episodes combined were compared with the estimates from the literature of 40 percent for short-term survival and 30 percent for long-term survival, using the z statistic for the normal approximation to the binomial distribution.

## RESULTS

### The Epidemiology of Cardiac Arrest

We viewed a total of 97 episodes (25 of *ER*, 22 of *Chicago Hope*, and 50 of *Rescue 911*) and observed 60 occurrences of CPR. The majority of cardiac arrests were caused by trauma, such as gunshot wounds, motor vehicle accidents, and near-drowning (Table 1). Only 28 percent were due to cardiac causes, such as myocardial infarction or a primary arrhythmia. Many were due to unusual causes, such as lightning, hypothermia, eclampsia, and pericarditis due to lupus erythematosus. Sixty-five percent of the cardiac arrests occurred in children, teenagers, or young adults (Table 2). Male patients accounted for 44 (73 percent) of the cases; 36 cases (60 percent) occurred outside the hospital. Only seven patients were depicted as having underlying illnesses; these included heart disease, dementia, brain damage, lupus erythematosus, and diabetes.

### Survival after CPR

Of the 60 patients who underwent CPR, 46 (77 percent) survived the immediate cardiac arrest (Table 3). The rate of short-term survival was highest on *Rescue 911* (100 percent, a rate that is not surprising in a series that, by intention, presents successful rescues). *ER*

Table 1. Causes of Cardiac Arrests in Three Television Series.

CAUSE	NO. OF CASES
Near-drowning	9
Motor vehicle accident	5
Gunshot wound	8
Stab wound	1
Other trauma	7
Arrhythmia	7
Myocardial infarction	6
Other cardiac cause	3
Sepsis	2
Lightning	2
Electric shock	1
Hypothermia	1
Inhalation of cleaning agent and butane	1
Ruptured abdominal aortic aneurysm	1
Congenital heart disease	1
Diabetic ketoacidosis	1
Pericarditis due to lupus erythematosus	1
Eclampsia	1
Drug overdose	1
Cocaine toxicity	1

portrayed a rate of short-term survival of 65 percent, and *Chicago Hope* a rate of 64 percent.

Of the 60 patients, 22 (37 percent) clearly survived until discharge from the hospital. Of the 46 patients who were successfully resuscitated by CPR, 6 died soon thereafter. For the remaining 18 — all on *ER* — no information was provided about survival until discharge. This series focuses on patients in the emergency department and generally does not provide further follow-up on outcomes. In most cases, however, long-term survival was implied by the fact that the patients survived the arrest in response to which CPR was given and the *ER* staff members considered their work successful.

Survival rates for CPR on these television programs were significantly higher than the highest rates reported in the literature. For short-term survival, the rate of success on television was 75 percent, as compared with 40 percent in the literature ( $P < 0.001$ ), and for long-term survival (assuming that the patients on *ER* about whom no explicit information was given survived to discharge), the rate of success was 67 percent (40 patients survived) as compared with 30 percent ( $P < 0.001$ ).

Only one survivor of CPR on television, a 16-year-old boy who had inhaled a cleaning agent and butane, incurred any obvious disability. He recovered from his cardiac arrest, completed high school, and became a motivational speaker warning about the dangers of drug abuse. He was shown walking normally with his family, but spoke with a moderate dysarthria in his public appearances. In the real world, disability after cardiac arrest is much more common.<sup>20</sup>

### The Portrayal of Death

On the 97 television episodes, 37 patients died. There were 24 deaths on *ER*, 12 on *Chicago Hope*, and 1 on *Res-*

cue 911. The last was a young man in a motor vehicle accident whose family gave permission for organ donation. Of the deaths, 2 were of children, 6 of teenagers, 13 of young adults, 10 of middle-aged adults, and 6 of elderly persons. Twenty-seven of the deaths were of men or boys (73 percent), and 10 were of women or girls (27 percent). Fourteen deaths were due to trauma, seven to heart disease, three to cancer, two to the acquired immunodeficiency syndrome, and four to unknown causes; the remainder were due to miscellaneous causes such as eclampsia, sepsis, drug overdose, aortic dissection, and suicide.

CPR was shown for 18 of the 37 patients who eventually died. In only eight of the situations in which patients died was there a portrayal of discussions about CPR or any reference to do-not-resuscitate orders.

### The Focus on Miracles

On *Rescue 911*, the term “miracle” was used to describe the patient’s survival in 10 of 18 instances (56 percent). The use of the term was supported by the comments of physicians who were involved in the care of the actual patient. In the 10 episodes, the real physicians described their initial extreme pessimism about their patients’ chances for a meaningful recovery. After all the patients went on to lead normal lives, family members and health care providers called the recoveries miraculous.

In one episode, a young man was struck by lightning outside his home and initially received CPR from his wife. The paramedic who cared for the patient at the scene said, “It didn’t look good. . . . He was in a rhythm called asystole, otherwise known as flatline. We felt the patient would probably not survive.” After 30 minutes of asystole, with vigorous advanced cardiac life support, the patient regained a normal sinus rhythm. He was transported to a local emergency department. There, the emergency physician remembered, “His EEG suggested that he was not likely to make any useful recovery.” After the patient was placed on ventilatory support, his wife said, “I would go in and hold him, touch him. I was always talking to him. I never gave up

Table 2. Age Groups of Patients Undergoing CPR in Three Television Series.

SERIES	CHILD	TEENAGER	YOUNG ADULT	MIDDLE-AGED ADULT	ELDERLY PERSON	TOTAL
<i>Chicago Hope</i>	2	2	1	5	1	11
<i>ER</i>	5	7	9	7	3	31
<i>Rescue 911</i>	9	1	3	3	2	18
Total	16 (27)	10 (17)	13 (22)	15 (25)	6 (10)	60

Table 3. Survival after CPR in Three Television Series.

SERIES	NO. OF EPISODES	NO. OF OCCURRENCES OF CPR	SHORT-TERM SURVIVAL AFTER CPR	SURVIVAL TO DISCHARGE AFTER CPR	SHORT-TERM SURVIVAL, DEATH IN HOSPITAL	SHORT-TERM SURVIVAL WITHOUT FOLLOW-UP
<i>Chicago Hope</i>	22	11	7 (64)	4 (36)	3 (27)	0
<i>ER</i>	25	31	21 (68)	NA*	3 (10)	18 (58)
<i>Rescue 911</i>	50	18	18 (100)	18 (100)	0	0
Total	97	60	46 (77)	22 (37)	6 (10)	18 (30)

\*Not applicable. *ER* deals only with events in the emergency department.

hope. . . . They were talking about, if he lived, he had a 1 percent chance of being a functional human being.”

Five weeks later, the patient was released from the hospital and went on to a complete recovery. Reflecting on the case, his physician said, “The most amazing thing to me about J.’s recovery is that we were wrong. We had given up hope. His wife did not. She saw us through the extra week, and that made a difference. I think there’s no question that if she had lost hope, there might have been a different outcome.” The patient’s wife herself was even more emphatic. She said, “It truly is a miracle that he is alive.”

In the episode about the 16-year-old boy who had cardiac arrest after inhaling a cleaning agent and butane, computed tomography after resuscitation revealed cerebral edema. The boy’s physician remembered that “my hopes were going down by the minute.” The physician asked the family to consider organ donation if the boy were to die. The patient’s mother remembered that “the doctor gave us no hope at all. . . . They were saying that if he came out of it at all, he might be a vegetable.” After 17 days in a coma, the young man began to recover. After rehabilitation he completed high school and was described as “85 percent back to normal.” The physician commented, “I’ve never seen anyone in as bad a shape as he was make it. That’s a miracle.”

### DISCUSSION

Patients participate in decisions about their care today as never before. As the physician–patient relationship has evolved into a collaborative one, patients are expected to digest and evaluate complex information, often at a time of great emotional stress. This is particularly true with respect to decisions about the end of life.

Patients have few sources from which to learn about illness and death. Acute illness — and, in particular, terminal illness — is for many people no longer part of everyday life. Therefore, images in the media strongly shape the public’s beliefs about medicine, illness, and death.<sup>21</sup> The portrayal of CPR and death on three popular television programs is misleading in a number of ways.

First, these three television programs give a mislead-

ing impression about the kind of people most commonly given CPR. On television, children, teenagers, and young adults accounted for 65 percent of the patients given CPR. Of the total number of deaths on the programs, 83 percent were of nonelderly patients. In fact, cardiac arrest is much more common in the elderly than in children or young adults.

Second, cardiac arrest on television was often due to acute injury, the result of gunshot wounds, motor vehicle accidents, or near-drowning; only 28 percent of the patients had primary cardiac arrests. In real life, 75 to 95 percent of arrests result from underlying cardiac disease.<sup>8,10,19</sup>

Third, CPR succeeded more frequently on television than in the real world as reflected in the medical literature. On all three shows combined, 75 percent of the patients were alive immediately after their cardiac arrests, and 67 percent appeared to survive in the long term. On *Rescue 911*, which focuses on the successes of emergency services, the survival rate after CPR was 100 percent. Of the patients on *ER*, 65 percent survived the initial arrest; three of these patients died before discharge from the hospital. On *Chicago Hope*, 64 percent of the patients given CPR initially survived cardiac arrest, and 36 percent survived to discharge.

Comparing these survival rates with those in the medical literature is problematic, since the patients seen on television differ dramatically from those described in the literature with respect to age, underlying illness, and the cause of cardiac arrest. Nevertheless, we would argue that the survival rates in the medical literature are the figures that ought to be given the most weight by patients and families making decisions about the use of CPR.

Rates of long-term survival after cardiac arrest as reported in the medical literature vary from 2 percent to 30 percent for arrests outside a hospital, and from 6.5 percent to 15 percent for arrests that take place inside a hospital.<sup>6-19</sup> For average elderly patients, the rate of long-term survival after cardiac arrest outside a hospital is probably no better than 5 percent. For arrests due to trauma, the reported survival rates vary from 0 to 30 percent.<sup>22-25</sup> Clearly, the rates on television are significantly higher than even the most favorable data reported in the literature.

Finally, on television, the outcome of CPR was generally portrayed as either full recovery or death. The only case of disability was in the young man who had moderate dysarthria after his inhalation of butane and a cleaning agent. If CPR were a benign, risk-free procedure that offered a good hope of long-term survival in the face of otherwise certain death, few people would ever choose to have medical personnel withhold resuscitation. But controversy surrounds the use of CPR precisely because the procedure can lead to prolonged suffering, severe neurologic damage, or an undignified death.<sup>26</sup> In 97 episodes of these medical dramas and reenactments, such outcomes were never portrayed. CPR

on television is given primarily to people suffering from acute illness or injury; the possible outcomes are dichotomized into full recovery or immediate death. By avoiding the portrayal of the full range of possible outcomes of CPR, these programs skirt the complicated ethical issues that physicians, patients, and families need to consider.

In a subtle way, the misrepresentation of CPR on television shows undermines trust in data and fosters trust in miracles. In the stories retold on *Rescue 911*, physicians often predict poor outcomes for patients, while family members voice their hope and, in the end, their joy in the “miracle” of their loved ones’ recovery. We acknowledge that this drama produces good television, as evidenced by the large viewing audiences. However, these exceptional cases may encourage the public to disregard the advice of physicians and hope that such a miracle will occur for them as well. Faith is central to our ability to maintain hope in difficult situations and often is an important adjunct to the therapy physicians offer. Belief in miracles, however, can lead to decisions that harm patients. The portrayal of miracles as relatively common events can undermine trust in doctors and data.

Misrepresentations of CPR on television may lead patients to generalize their impressions to CPR in real life. For example, an 85-year-old woman with metastatic breast cancer may believe that CPR can work as well in her situation as it does for the 23-year-old trauma victim on television. Physicians discussing decisions about the end of life with patients and families should be aware that the public has many sources of information about CPR, some of them misleading. To help patients and families make informed decisions, doctors should encourage patients to discuss their impressions of CPR and its chances of success. We should clarify misperceptions, provide actual data on outcomes, and address specifically the differences between CPR as seen on television and CPR as it is experienced by real patients.

There are limitations to our study. First, we looked at only three television programs. We chose these programs because they enjoy enormous popularity and focus on medicine, but the occasional portrayals of CPR elsewhere may be more realistic. Second, this analysis rests on the assumption that the public does not distinguish fact from fiction. Unfortunately, however, an important part of the attraction of these television programs is their realism.<sup>27</sup> In many respects, these programs accurately portray the medical environment. People want to go behind the scenes to see true stories of medicine, and modern television works hard to satisfy this curiosity. Because these shows appear realistic in many respects, the line between fact and fiction is blurred.

What should our response be? Given the media’s extraordinary influence, we could hope that the producers of television programs might recognize a civic re-

sponsibility to be more accurate. This may not happen, however. The primary goal of these television series is to entertain, a goal served by the high drama and the promise of hope all three shows offer.

Given this reality, physicians need to recognize and acknowledge the images the media present as we help patients and families make informed decisions about the use of CPR. During discussions about the use of CPR, we should inquire about our patients' perceptions of survival after CPR, specifically address the images of CPR on television, and present quantitative data about possible outcomes to our patients, when appropriate. With these efforts, physicians, patients, and families will be able to make better-informed decisions about these difficult issues.

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