



Hospital based Remote Advance Care Directives Advice during the COVID-19 Pandemic: A Prospective Study

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Abstract

Objectives: During the Coronavirus 2019 pandemic (COVID-19), the pressure on hospital capacity and the Intensive Care Unit (ICU) increased dramatically. Advance Care Planning (ACP) with patients is of utmost importance. The aim of this study was to examine whether a remote independent Advance Care Directives (ACD) advice could support treating physicians in ACP.

Methods: In this single center prospective observational study, we included 167 patients with a COVID-19 infection on the internal medicine ward between 17th March and 17th April 2020. An ACD committee of medical specialists, not directly involved in the care of these patients, formulated a remote independent ACD advice to the treating physicians concerning escalation of care. Follow up for survival was evaluated after 6 months. The treating physicians completed an online survey concerning the value of the remote independent ACP advice.

Results: In 149 out of the 167 cases (89.2%) the advice of the ACD committee matched the decision of the treating physician. A negative ACD advice for mechanical ventilation has been overruled in three patients. These three patients died despite escalation to mechanical ventilation on the ICU. Of the treating physicians, 95.6% confirmed benefit of the advice.

Conclusion: Independent remote ACD advice during the COVID-19 pandemic could offer valuable help in the decision making process whether to escalate to life-sustaining critical care for treating physicians and patients.

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Background

In the beginning of March 2020 Europe has landed in a deep health crisis due to the Coronavirus Disease 2019 (COVID-19) pandemic [1]. The Dutch official national health organization registered 12,595 new cases of COVID-19 infection and 4,712 hospitalizations in March 2020 alone [2]. This sudden increase in patient cases put a massive burden on physicians and hospital capacity. Intensive Care Unit (ICU) capacity was imminently exhausted [3]. Despite national coordination to relocate and distribute patients with COVID-19 in the Netherlands, some patients needed to be transferred to German ICU's.

The European Respiratory Society International task force suggested that Advance Care Planning (ACP) at the time of hospitalization is crucial to avoid unwanted and burdensome life-sustaining treatments [4]. However, these are difficult conversations to both physicians and patients [5]. ACP empowers patients and their health care professionals to discuss and establish wishes and goals for future medical care [6,7].

As the cases of COVID-19 patients presenting at the emergency departments in the Netherlands were mounting, a timely evaluation whether the wish of a patient to be admitted on the ICU was medically pertinent. An ACP discussion with each individual patient and their family was proving increasingly difficult for physicians in the frontline. Our goal was to provide support by performing Advance Care Directives (ACD) advice to help conducting an informed ACP discussion with patients and their families when considering an ICU admission for mechanical ventilation.

The aim of this single center prospective study was to investigate if a remote independent ACD advice may have an additional value in the decision making process whether to escalate to life-sustaining critical care and to evaluate if this advice could significantly predict the outcome of the patient.

Methods

An ACD Committee (ACDC) consisting of seven accredited medicals specialists in internal medicine with extensive medical expertise in palliative care has been installed in the beginning of March 2020.

The remote advice has been based on the patient's medical file and if necessary after consultation with the general practitioner and/or attending medical specialist. For this purpose, we used a model based on objective criteria as previously described by the guideline of the Dutch Intensive Care Association specially formulated in response to the COVID-19 crisis (Table 1) [8]. To ensure the independent character of this process, no direct contact has been established between the ACDC and the patients or families.

By weighing each individual factor, the ACDC assessed the potential clinical benefit of an ICU admission and mechanical ventilation for each individual patient and formulated a clinical advice. This advice was registered and visible in the electronic medical record for the treating physician. The final determinative decision was in all cases formulated solely by the treating physician.

Between March 17th and April 17th of 2020 we prospectively included all patients with a suspected or proven COVID-19 infection at the time of admission to the Emergency Department (ED) of the Internal Medicine ward. Criteria for the diagnosis COVID-19 were: A positive PCR test or clinical presentation in combination with typical radiological findings. We collected data on patients' clinical characteristics, comorbidities and course of the hospital admission and we calculated the relative risk for death when overruling a negative ACDC advice for mechanical ventilation. We performed a six months post hospitalization follow up for survival.

The treating physicians completed subsequently an online survey of nine questions about the value of the remote independent ACP advice and their role.

Results

Baseline characteristics

In total, we analyzed 169 patients. Two patients were excluded due to an incomplete medical file. Out of the 167 patients, a vast majority was male (69.5%). Thirty-five patients died in the hospital, of which 10 in the ICU. The clinical characteristics of our patients are described in Table 2.

Advance care directives advice

In 149 out of the 167 cases (89.2%) ACDC advice was in agreement with the final decision of the treating physician and the wish of the patient. In 18 cases (10.8%) the treating physician overruled the ACDC advice. Three patients were admitted to the ICU despite a negative ACDC advice. All these three patients died ultimately in the ICU. The calculated relative risk of death in case of a negative ACDC for ICU admission and mechanical ventilation was 5.0 (BI; 2.58–9.70). (For cross table ICU admission advices see Table 3).

Difference in interpretation

In eight of the eighteen overruled cases, the ACDC gave a positive advice for mechanical ventilation while the treating physician decided in full agreement with the patient not to escalate to an ICU admission. Their decision was based on patient's wish or rapid deterioration of their clinical condition. In three other cases, the ACDC advice was overruled by the treating physician after consulting with another

Table 1: Factors formulated by the Dutch Intensive Care Association.

What is the Body Mass Index?
Does the patient have metastatic disease?
Does the patient have a hematological malignancy with poor prognosis?
Does the patient have end stage organ failure?
What is the Clinical Frailty Score?
Does the patient have irreversible immune suppression?
Does the patient have a palliative operation scheduled?
Does the patient have relevant sarcopenia?
What is the cumulative comorbidity?
Is the answer to the surprise question "No"? ("Would it surprise me if this patient would die in the coming 12 months?")

Table 2: Baseline Characteristics n=167.

Gender	
- Male (%)	116 (69.5%)
- Female	51 (30.5%)
Average age (Q1-Q3)	67.8 years (60-76)
COVID-19 PCR test (%)	
- Positive	151 (90.4%)
- Negative	16 (9.6%)
Deceased (%)	35 (21.0%)
ICU admission (%)	38 (22.8%)
Average length of stay ICU admission in days (Q1 - Q3)	19.05 (7.0–26.0)
Average length of hospital admission in days (Q1 - Q3)	10.3 (3.0–11.0)
Place of destination after hospital admission (%)	Home 83 (49.7%)
	Deceased 35 (20.9%)
	Nursing home 4 (2.4%)
	Medical rehabilitation 34 (20.4%)
	Other hospital 11 (6.6%)
Smoking	
- Yes (%)	8 (4.7%)
- Stopped (%)	69 (41.3%)
- Never (%)	90 (53.9%)
Body Mass Index (Q1-Q3)	28.63 (25.0–32.0)
History cardiac disease (%)	44 (26.3%)
COPD/asthma (%)	38 (22.8%)
Hypertension (%)	85 (50.9%)
Diabetes Mellitus (%)	41 (24.5%)
Hematological malignancy (%)	7 (4.2%)
Metastatic disease (%)	7 (4.2%)
End stage organ failure (%)	4 (2.4%)
Irreversible immune suppression (%)	3 (1.8%)
Sarcopenia (%)	3 (1.8%)
Palliative surgery (%)	0 (0%)

medical specialist, for instance a pulmonologist or cardiologist. In seven cases (4.2%), the reason for overruling remained unclear. Three of those seven patients were discharged within 48 h.

In three patients who had a positive advice from both the ACDC and the treating physician, the care was not escalated to an ICU

Table 3: Cross table advice regarding ICU admission.

Cross table Advice regarding ICU admission			
	Postive decision treating physician	Negative decision treating physician	Total
Positive advice ACDC	51	10	61
Negative advice ACDC	8	98	106
Total	59	108	167

Table 4: Unreported answers of the online survey.

Question	Answers
Quality multidisciplinary consultation	Increase: 26
	Neutral: 14
	Decrease: 1
	Unanswered: 4
Insight frailty of the patient	Increase: 28
	Neutral: 16
	Decrease: 0
	Unanswered: 1
Feeling of support	Increase: 33
	Neutral: 8
	Decrease: 1
	Unanswered: 3
Workload	Increase: 2
	Neutral: 29
	Decrease: 8
	Unanswered: 6
Accuracy of decision	Increase: 31
	Neutral: 11
	Decrease: 1
	Unanswered: 2
In which cases do you see benefit in an independent advice	In times of ICU scarcity: 13
	In times without ICU scarcity: 6
	Both times: 23
	Never: 2
	Unanswered: 1

admission due to the explicit wish of the patient. These three patients were interpreted as an equal decision in this study.

Feedback from treating physicians

Forty five of the fifty nine treating physicians completed the online survey (76.3%). Of these responders, 23 were medical residents, 14 medical specialists in internal medicine and 8 pulmonologists. Twenty-six of the respondents were men.

Forty three of the forty five responders have indicated they found the advice of the ACDC helpful (95.6%). Twenty five (55.5%) of them expressed their disappointment when the advice was not present. Only thirteen (28.9%) of the treating physicians did not express any distress when the ACDC advice was not available (Table 4).

Discussion

In time of the COVID-19 health care crisis we were confronted with difficulties in the decision making process as to escalate or not

to advance life support due to exhausted resources, shortage of staff and fast progression of the COVID-19 pandemic. In this prospective study, an independent ACD committee took time to remotely individually assess the potential effect of comorbidities on patient’s ability to benefit from critical care admission.

The independent ACDC advice is frequently in line with the assessment of the treating physician and is highly appreciated. A negative ACD advice based on a structured model seems to be able to predict a poor outcome for COVID-19 patients when admitted to the ICU. Overruling the advice regarding escalation of care with admission to the ICU did not result in a better clinical outcome. Out of the eighteen overruled cases, eleven could be rationally explained by rapidly aggravating clinical condition or the wish of the patient. Three patients have been discharged forty eight hours after admission making the ACDC advice presumably unnecessary. Only four cases remained unclear (2.4%).

Our independent ACDC advice used a structured model based on criteria’s formulated in the guideline of the Dutch Intensive Care Association. We performed an individualized assessment of frailty and functional status, cumulative comorbidities emphasizing the presence of terminal organ failure, malignancies and an irreversible immune compromised state. These factors, next to constitutional variables (BMI, sarcopenia) have proven to be relevant when considering the ability of critical ill patients to recover from prolonged mechanical ventilation on the ICU and are in line with the British model as formulated by Montgomery et al. [9]. However, our model does not include age as an independent criterion and has, contrary to the British model, a binary outcome [8,9].

A major advantage of our model is the simple, remote and short algorithm, making it easy applicable in times of stress. The fact that our advice was independent has both pro’s and con’s. The major advantage is the independent character. The major disadvantage is the fact that the evaluation of a COVID-19 patient is a rapidly progressing process. At a distance, one might miss fast and continuous changing clinical variables.

Mortality in critical ill COVID-19 patients is high making the ICU care especially challenging. Mortality of patients admitted to the ICU in this study was 26.3% and average length of stay was 19 days. A recent systematic review and meta-analysis by Abeta et al. [10], demonstrated that the ICU-admission rate in patients with a COVID-19 infection was 32% and the pooled prevalence of mortality in the ICU was 39% [10].

Furthermore, avoiding non-beneficial or undesired high-intensity care becomes highly important in times of stress on healthcare capacity amidst a pandemic [11].

The ACDC advice provided a solid base and point of reference for the challenging conversations between the treating physician and the patient with their family about their life expectations, values and goals. A vast majority (95.6%) of the treating physicians found the advice helpful, underlining the added value.

It is important to underline that during this study the member of the ACDC had no direct contact with the patient and the patient’s family. This is both strength in sense of efficiency and simultaneously a limitation. Conversation with the patient remains the cornerstone in ACP. The ACDC advice should never replace a direct ACP conversation between the treating physician and the patient.

Conclusion

This prospective single center study shows that remote, independent ACD advice during a pandemic helps to support the treating physician in deciding with the patient if an ICU admission for mechanical ventilation is in the patient's best interest.

Key Messages Box

What was already known?

- Advance care planning avoids unwanted and burdensome life-sustaining treatments and is of uttermost importance during the COVID-19 pandemic.
- Advance care planning becomes increasingly difficult during a pandemic.
- What are the new findings?
- Hospital based remote advance care directives advice by a medical specialist matches in 89% of the cases the decision of the treating physician.
- 95.6% of the treating physicians confirmed benefit of the advice of the remote advice.
- What is their significance?
- Hospital based remote advance care directives advice by a medical specialist could offer valuable help in the decision making process whether to escalate to life-sustaining critical care for treating physicians and patients.

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