

Short Communication

Disease Course and Patient's Characteristics in a Regional First Level Hospital in Western-Germany During the First Three Covid-19 Surges from March 2020 to July 2021

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Introduction

The worldwide spread of SARS-CoV-2 profoundly affected almost all aspects of public life and challenged international and national health institutions of all different medical care levels including Europe up from the very beginning in 2020 until today.

Public and press perception might have been weighed somehow towards third level health care providers offering treatment options like ECMO therapy for Covid-19 patients with the worst disease course, the majority of patients who needed hospital care were treated in hospitals of the first level. These hospitals provided about 50% of intensive care treatments in the federal state of Rhineland Palatinate (RLP) in Germany, too [1].

According to the Destatis [2] about 71000 additional deaths were registered in Germany during the first 12 months (02/2020 – 02/2021) of pandemic of which about 50000 could be attributed to Covid-19 as given in the medical death reports. However, only few data has been published on the concrete disease course and patient's outcome on the scale of a single treatment site. Thus, this analysis provides routine data on patient's characteristics, treatment modalities and outcome in a single first level hospital in RLP during the first three Covid-19 surges during 03/2020 – 07/2021.

Material and Method

All patients who were admitted to the hospital and needed isolation and treatment due Covid-19 disease were identified via positive PCR-test. Age, sex, treatment modalities, need for intensive care, medication, co-morbidities and outcome were retrieved from pseudonymized routine data (provided to the regional and national health authorities) by a single physician in a mere retrospective manner.

Results

A total of 271 patients with a mean and median age of 72 and

77 years, respectively, were treated on ward, while 9 out of 271 were directly released from the emergency unit due to light symptoms, 4 patients had to be moved to other clinics due to lack of capacity, then. Thus, a total of 258 Covid-19 patients (male $n = 116$, mean age 69; female $n = 142$, mean age 75) were either isolated on the infectious ward or on ICU.

While the first surge (03/2020 – 04/2020) embracing 19 patients was low, the 2nd and 3rd surge included 188 and 51 patients from 10/2020 to 02/2021 and 03/2021 to 07/2021, respectively. The majority of 70% ($n = 181$) patients were geriatric patients (age > 65 years), most of them were self caring in own households ($n = 116$), whereas 65 were housed in nursing homes at the time point of admission. Particularly, the second surge affected elder persons: 144 out of 188 were aged > 65 years, 42% of them (60/144) were nursing home residents.

Standard medical care were administered to 200 patients (mean age 73 years) on the infectious ward exclusively. Additionally 45 and 13 patients required intermittent or immediate intensive care treatment, respectively (Table 1). Mean and median age of ICU patients ($n = 58$) were 71 and 76 years. On ICU 46% ($n = 27$) patients needed mechanically ventilation via intubation (IV), additionally, non-invasive-ventilation (NIV) or high-flow-oxygen-therapy (HFO) via nasal cannula were administered to further three and four patients, respectively. Medical treatment relied on then existing treatment recommendations [3-5] and consisted of 12 treatment circles remdesivir in standard dosage of 200 mg on day 0 followed by 100 mg for day 1- to 4; dexamethason was administered to a total of 32 patients in a dosage of 6 mg for 5 to 10 days, and 39 patients received additionally antibiotics on ICU due to bacterial superinfection or co-infection. Overall, disease cause was lethal in 30 (52%) of ICU-patients (IV: $n = 19$; NIV: $n = 3$; HFO: $n = 1$; O2: $n = 5$; ex domo: $n = 6$) with a mean age of 78 years after 11 days of ICU care. Regarding the subgroup of 13 patients, who needed immediate transfer to ICU, prognosis was even worse, 10 received IV, two NIV/HFO, three qualified for ECMO rescue therapy ex domo, however, 84% ($n = 11$) died in this subgroup.

At out site, death occurred only in five patients younger than 65 years, all of them had relevant comorbidities such as diabetes, arterial hypertension, COPD, and three patients also had underlying malignancies (lymphoma, lung cancer).

Admission to the infectious ward ($n = 200$) was triggered by dyspnoea, high temperature, severe coughing, dehydration, gastrointestinal symptoms, and anxiety. Thus, oxygen application via

Table 1: Patients characteristics of Covid-19 surges one to three in a single first level center in Western Germany.

	Hospital treatment	ICU	Infectious ward	Age <65	Age > 65	
					Independent	Nursing
					household	home
Patients	258	58	200	77	116	65
Female	142	22	120	31	71	40
Male	116	36	80	46	45	25
Average Age	72	71	73	52	81	85
Median Age	78	76	79	53	82	84
1 st surge	19	3	16	7	9	3
2 nd surge	188	44	144	44	84	60
3 rd surge	51	11	40	26	23	2
Deaths	72	30	42	5	30	37
Female	41	16	25	3	15	14
Male	31	14	17	2	15	23
Average Age	82	78	84	59	82	85
Median Age	83	82	84,5	62	82	85
1 st surge	1	0	1	0	1	0
2 nd surge	65	28	38	5	25	35
3 rd surge	6	2	3	0	4	2

nasal cannula or mask was given to 141 patients, remdesivir infusion to 24. A substantial number (n = 65) were on antibiotics. Inhalative corticosteroids were given to 26 patients in the period from 03 to 06/2021 in accordance with the national treatment recommendations at this time. 42 patients (21%; male n = 17; female n = 25) succumbed to the disease at a mean age of 84 years after almost 8 days of hospital treatment. In all cases either therapy escalation was declined by declared patients' will or written testimony or they didn't qualify for intensive therapy escalation due to e.g. age or severe comorbidities.

Taken together, 258, mainly elderly (70%; mean age 81 years), patients had to be treated for SARS-Cov-2 infections or associated complications, while the vast majority of all Covid-19 patients (72%) could be released from hospital; mortality on infectious ward was 21%. Particularly, in the subgroup of elder patients living in nursing homes mortality was high during the second wave.

Discussion

Specific medical treatment still had to be defined at the beginning of the SARS-Cov-2 pandemic and the overall knowledge rapidly developed. Namely, the availability of (mRNA-) vaccination up from 12/2020 for highly vulnerable mostly elderly persons improved prognosis of Covid-19 disease in so called vulnerable high risk patients. Correspondingly this retrospective single center analysis reveals, that prognosis was worst in geriatric nursing home residents. Covid-19 lethality rate adds up to some excess mortality rate as recently analysed by Destatis showing a substantial increase also for Germany [2]. According to our experience Covid-19 prognosis was not only limited by the underlying medical condition itself, a considerable number of patients also rejected potentially available therapy escalations. At no point of time, the lack of capacity limited treatment decisions at our site. Although mean age of patients was

high in our patients, the overall mortality rate (28%) was at the low range of published data ranging from 16% to 80% in the literature [6-9]. According to Bein et al. this holds true for other German sites, about 10000 patients were treated German hospitals due to Covid-19 with an overall mortality rate of 53% for intubated patients peaking to 73% in case of ECMO therapy [10].

Despite quite rapid publications of treatment recommendations for Covid-19, especially in the first two surges nursing and medical teams had to rely on experience and treatment analogies to other infectious diseases. In this situation, decision finding was sometimes even complicated by in some aspects conflicting recommendations as outlined by Struwe et al [11]. Aggravatingly, this even affected therapeutic essentials like application of inhalative corticosteroids, anticoagulation, administration of antibiotics, time point of intubation and others.

This retrospective single site routine data analysis gives some insight into the clinical scenario during the first three Covid-19 surges in a first level clinical hospital. Treatment and outcome were comparable to so far published data. And beyond this, nursing home residents were the most vulnerable individuals in this setting. Regarding this aspect, availability of SARS-CoV-2 vaccination in this region of Germany up from December 2020 probably made the most critical difference between the second and third Covid-19 surge.

Limitations

Obviously, the presented analysis is limited by its retrospective character and single site data acquisition. Although diagnosis and medical care always was in accordance with the then existing national recommendations, due to overall volatility of the pandemic, rapid scientific development, and regional differences in the pandemic these data analysis cannot be considered to representatively account

for other health care institutions throughout Germany. Evidently, mean age of patients described was higher and individual patient's wish and testimony may be at least partly be responsible for specific local aspects affecting disease courses in this cohort.

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