

# Pharmacologic Treatments and Supportive Care for Middle East Respiratory Syndrome

## Appendix

**Appendix Table 1.** Summary of specific treatments used by clinicians for the treatment of MERS-CoV in humans in each of the studies. Number of patients who did not survive (NS) and received each therapy reported where available\*

Reference	Patients (n)	Specific Treatments										
		Ostmvr	Ribavirin	IFN-α2a	IFN-α2b	IFN-β1a	Steroids	CvP	MMF	Macrolides	IVIg	Lopi/r
<b>Nonrandomized, Single-Arm Intervention Study with Historical Comparisons</b>												
(1)	32	0	24 (75%) NS 19 (79%)	13 (41%) NS 11 (85%)	0	11 (34%) NS 7 (64%)	0	0	0	0	0	0
(2)	35	0	14 (83% ECMO) 4 (29% no ECMO)	11 (65% ECMO) 4 (36% no ECMO)	0	0	9 (53% ECMO) 13 (72% no ECMO)	0	0	0	0	0
(3)	44	33 (73%)	20 (46%)	20 (46%)	0	0	23 (52%)	0	0	0	0	0
<b>Prospective Cohort Study</b>												
(4)	30	0	30 (100%) NS 6 (20%)	30 (100%) NS 6 (20%)	0	0	1 (3%) NS 1 (100%)	2 (7%) NS 1 (100%)	0	0	3 (10%) NS 3 (100%)	0
(5)	8	8 (100%) NS 5 (63%)	8 (100%) NS 5 (63%)	8 (100%) NS 5 (63%)	0	0	8 (100%) NS 5 (63%)	0	0	0	0	0
<b>Retrospective Cohort Study</b>												
(6)	309	169 (55%)	127 (41%)	119 (39%)	0	0	151 (49%) NS 114 (76%)	0	0	0	0	0
(7)	330	177 (54%) NS 112 (63%)	133 (40%) NS 96 (72%)	124 (38%) NS 104 (84%)	0	0	177 (54%) NS 133 (75%)	0	0	0	23 (7%) NS 16 (70%)	0
(8)	31	20 (65%) NS 15 (75%)	13 (42%) NS 9 (69%)	13 (42%) NS 9 (69%)	0	0	8 (26%) NS 6 (75%)	0	0	0	0	0
(9)	29	0	10 (35%) NS 3 (30%)	19 (66%) NS 6 (32%)	0	0	29 (100%) NS 10 (35%)	0	0	19 (66%) NS 6 (32%)	0	0
(10)	14	7 (50%)	11 (79%) NS 6 (55%)	11 (79%) NS 6 (55%)	0	0	14 (100%) NS 9 (64%)	0	0	0	0	0
(11)	51	0	19 (38%) NS 6 (32%)	8 (16%) NS 2 (25%)	0	23 (45%) NS 5 (22%)	5 (10%) NS 3 (60%)	0	8 (16%) NS 0	0	0	0
(12)	314	NR	NR	NR	NR	NR	NR	NR	0	0	NR	0

Reference	Patients (n)	Specific Treatments										
		Ostmvr	Ribavirin	IFN-α2a	IFN-α2b	IFN-β1a	Steroids	CvP	MMF	Macrolides	IVIg	Lopi/r
(13)	349	196 (56%)	NR	NR	NR	NR	178 (51%)	0	0	136 (39%)	24 (7%)	NR
(14)	302	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
(15)	349	196 (56%)	122 (35%)	73 (58%)	22 (18%)	40 (11%)	178 (51%)	NR	NR	NR	NR	NR
Case Series without Evaluation of Treatment												
(16)	5	5 (100%) NS 5 (100%)	5 (100%) NS 5 (100%)	0	5 (100%) NS 5 (100%)	0	5 (100%) NS 5 (100%)	0	0	0	0	0
(17)	12	7 (58%)	0	0	0	0	10 (83%)	0	0	0	1 (8%)	0
(18)	107	13 (12%)	61 (57%)	47 (43%)	54 (51%)	48 (45%)	24 (22%)	14 (13%)	22 (21%)	59 (55%)	33 (31%)	41 (38%)
(19)	6	0	6 (100%) NS 3 (50%)	6 (100%) NS 3 (50%)	0	0	1 (17%) NS 0	0	0	0	0	0
(20)	63 (8 included)	0	0	0	0	0	0	0	0	0	0	0

\*NS, non-survivors; Ostmvr, Oseltamivir; MMF, Mycophenolate mofetil; IFN, interferon; IVIG, intravenous immunoglobulins; CvP, Convalescent Plasma; Lopi/r, Lopinavir/ritonavir; NR, not reported.

**Appendix Table 2.** Summary of supportive care used by clinicians for the treatment of MERS-CoV in humans in each of the studies. Where available table shows unadjusted number of patients receiving therapy in each arm of the study with p values reported by authors. Number of patients who did not survive (NS) and received each therapy reported where available\*

Reference	Patients (n)	Supportive Care						
		NIV	Mechanical Ventilation	NMB	Nitric Oxide	ECMO	Vasopressors	RRT
Nonrandomized, Single-Arm Intervention Study with Historical Comparisons								
(1)	32	NR	16 (50%)	NR	NR	NR	NR	8 (25%)
(2)	35	0	35 (100%)	NR	NR	17 (49%)	NR	NR
(3)	44	3 (7%)	41 (93%)	NR	NR	4 (9%)	32 (73%)	22 (50%)
Prospective Cohort Study								
(4)	30	NR	8 (27%) NS 6 (75%)	NR	NR	2 (7%) NS 2 (100%)	NR	2 (7%) NS 1 (50%)
(5)	8	5 (63%)	7 (88%)	NR	NR	1 (13%) NS 0	NR	NR
Retrospective Cohort Study								
(6)	309	54 (36%) vs 41 (26%) (p = 0.06)	141 (93%) vs 121 (77%) (p < 0.0001)	74 (49%) vs 46 (29%) (p = 0.0003)	29 (19%) vs 10 (6%) (p = 0.0007)	10 (7%) vs 8 (5%) (p = 0.56)	134 (89%) vs 111 (70%) (p < 0.0001)	83 (55%) vs 69 (44%) (p = 0.05)
(7)	330	100 (30%) NS 63 (63%)	281 (85%) NS 204 (73%)	133 (40%) NS 97 (73%)	43 (13%) NS 34 (79%)	19 (6%) NS 13 (68%)	262 (79%) NS 199 (76%)	161 (49%) NS 131 (81%)
(8)	31	14 (45%) NS 8 (57%)	27 (87%) NS 22 (82%)	12 (39%) NS 10 (83%)	NR	1 (3%) NS 1 (100%)	25 (81%) NS 22 (88%)	16 (52%) NS 14 (88%)
(9)	29	NR	9 (31%) NS 8 (89%)	NR	NR	NR	NR	NR
(10)	14	2 (14%)	14 (100%)	11 (79%)	8 (57%)	0	12 (86%)	8 (57%)

Reference	Patients (n)	Supportive Care						
		NIV	Mechanical Ventilation	NMB	Nitric Oxide	ECMO	Vasopressors	RRT
(11)	51	NR	NR	NR	NR	10 (19.6%) NS 10 (100%)	NR	NR
(12)	314	NR	NR	NR	NR	NR	NR	NR
(13)	349	49 (36%) vs. 57 (27%) (p = 0.07)	117 (86%) vs. 180 (85%) (p = 0.7)	59 (43%) vs. 74 (35%) (p = 0.11)	23 (17%) vs. 21 (10%) (p = 0.05)	10 (7%) vs. 12 (6%) (p = 0.52)	107 (78%) vs. 169 (79%) (p = 0.88)	79 (58%) vs. 95 (45%) (p = 0.01)
(14)	302	105 (35%)	294 (97%)	51 (49%) vs. 82 (42%) (p = 0.25)	21 (20%) vs. 23 (12%) (p = 0.05)	11 (11%) vs. 11 (6%) (p = 0.12)	88 (84%) vs. 177 (90%) (p = 0.13)	49 (47%) vs. 115 (58%) (p = 0.05)
(15)	349	50 (35%) vs. 56 (27%) (p = 0.14)	126 (88%) vs. 171 (83%) (p = 0.29)	46 (32%) vs. 87 (42%) (p = 0.05)	20 (14%) vs. 24 (12%) (p = 0.55)	11 (8%) vs. 11 (5%) (p = 0.39)	111 (77%) vs. 165 (81%) (p = 0.44)	74 (51%) vs. 100 (49%) (p = 0.63)
Case Series without Evaluation of Treatment								
(16)	5	NR	5 (100%) NS 5 (100%)	NR	NR	NR	NR	5 (100%) NS 5 (100%)
(17)	12	5 (42%)	12 (100%)	4 (33%)	6 (50%)	0	11 (92%)	7 (58%)
(18)	107	NR	56 (52%)	NR	NR	46 (43%)	33 (31%)	31 (29%)
(19)	6	1 (17%) NS 0	3 (50%) NS 3 (100%)	NR	NR	NR	3 (50%) NS 3 (100%)	3 (50%) NS 3 (100%)
(20)	63 (8 HCWs)	12 (19%) HCWs 2 (25%)	51 (81%) HCWs 8 (100%)	HCWs 7 (88%)	HCWs 2 (25%)	HCWs 1 (13%)	37 (59%) HCWs 7 (88%)	37 (59%) HCWs 4 (50%)

\*NS, non-survivors; NIV, non-invasive ventilation; ECMO, extra-corporeal membrane oxygenation; NMB, neuromuscular blockade; RRT, renal replacement therapy; NR, Not reported

### Search Terms (Via MEDLINE)

Database: Ovid MEDLINE: Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE® Daily and Ovid MEDLINE® <1946-Present>

Search Strategy:

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1 exp CORONAVIRUS INFECTIONS/ or exp CORONAVIRUS/ or exp MIDDLE EAST RESPIRATORY SYNDROME  
CORONAVIRUS/ (13600)  
2 middle east respiratory syndrome.tw. (1317)  
3 coronavirus.tw. (8584)  
4 MERS.tw. (3344)  
5 MERS-CoV.mp. (1135)  
6 1 or 2 or 3 or 4 or 5 (18103)  
7 treatment.mp. or exp Therapeutics/ (7102731)  
8 interferon.mp. or exp Interferons/ (185605)  
9 ribavirin.mp. or exp RIBAVIRIN/ (15864)  
10 lopinavir.mp. or exp LOPINAVIR/ (2572)  
11 glucocorticoids.mp. or exp GLUCOCORTICIDS/ (194948)  
12 exp Mycophenolic Acid/ or mmf.mp. (9269)  
13 convalescent plasma.mp. (116)  
14 exp Antibodies, Neutralizing/ or exp Antibodies, Monoclonal/ or neutralizing monoclonal antibody.mp. (221498)  
15 IVIG.mp. or exp Immunoglobulins, Intravenous/ (14075)  
16 exp Spike Glycoprotein, Coronavirus/ (1147)  
17 6 or 16 (18114)  
18 supportive care.mp. (13380)  
19 mechanical ventilation.mp. or exp Respiration, Artificial/ (88846)  
20 exp VACCINES/ or vaccine.mp. (268922)  
21 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 18 or 19 or 20 (7549505)  
22 17 and 21 (5138)  
23 Humans/ (17200300)  
24 22 and 23 (2461)

**Appendix Figure.** Search strategy used for systematic review as shown in MEDLINE search. Search was repeated throughout 5 databases (MEDLINE, PubMed, Embase, Cochrane, and CINHAHL).

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