

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20184168>

Case Report

ECMO: a lifesaving modality in ARDS during puerperium

Sunil K. Juneja¹, Pooja Tandon^{1*}, Vivek Gupta², Gurpreet S. Wander², Rajesh Mahajan³,
Akashdeep Singh⁴, Reetika Aggarwal¹, Monika Narang¹, Suhasini Raina¹

¹Department of Obstetrics and Gynecology, Dayanand Medical College and Hospital, Ludhiana, Punjab, India

²Department of Cardiology, HDHI, Ludhiana, Punjab, India

³Department of Medicine, ⁴Department of Pulmonology, Dayanand Medical College and Hospital, Ludhiana, Punjab, India

Received: 16 February 2018

Revised: 06 July 2018

Accepted: 06 September 2018

*Correspondence:

Dr. Pooja Tandon,

E-mail: drpoojatandon77@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Acute respiratory distress syndrome (ARDS) is an uncommon condition encountered in pregnancy. The incidence of ARDS in pregnancy has been reported to be 1 in 6229 deliveries with mortality rates to range from 24% to 39% in pregnant patients. An essential component in management of ARDS involves good communication between the obstetrics team and critical care specialist and a fundamental understanding of mechanical ventilatory support. In critically ill patients where both cardiorespiratory support is required, Extracorporeal Membrane Oxygenation (ECMO) can be used to help maintain the vital functions. ECMO is a temporary cardio respiratory or respiratory support in critically ill patients who are unresponsive to conventional management. In present case a young female with post-partum ARDS was successfully managed with extra corporeal membrane oxygenation (ECMO).

Keywords: ARDS, ECMO, Puerperium

INTRODUCTION

Acute respiratory distress syndrome (ARDS) is an uncommon condition encountered in pregnancy. The causes of ARDS associated with nonobstetric causes include sepsis, aspiration pneumonitis, influenza pneumonia, blood transfusions, and trauma whereas obstetric causes include amniotic fluid embolism, preeclampsia, septic abortion, and retained products of conception. The incidence of ARDS in pregnancy has been reported to be 1 in 6229 deliveries for an incidence of 17 patients per 100000 with mortality rates to range from 24% to 39% in pregnant patients.¹ An essential component in management of ARDS involves good communication between the obstetrics team and critical care specialist and a fundamental understanding of

mechanical ventilatory support.² In critically ill patients where both cardiorespiratory support is required, Extracorporeal Membrane Oxygenation (ECMO) is used to help maintain the vital functions. ECMO is a temporary cardio respiratory or respiratory support in critically ill patients who are unresponsive to conventional management. It is a highly specialized form of ICU management where blood from the person's body is withdrawn through a widebore canula in a major vein (the right or left common femoral vein) and artificially the carbon dioxide is removed and red blood cells are oxygenated and then the blood is returned back to the right or left femoral artery.³ Authors here by present a case of young female with post-partum ARDS successfully managed with extra corporeal membrane oxygenation (ECMO).

CASE REPORT

A 25 years old, primigravida at 37 weeks gestation presented in our emergency department with complaints of pain lower abdomen and loss of fetal movements for 8 hrs. Apart from being hypothyroid for 3 years she had an

uneventful antenatal period. She underwent Lower segment Cesarean section due to fetal distress. The routine laboratory investigations were normal. Two days after the uneventful caesarean section she developed cough and fever and got examined by a physician.

Table 1: Serial investigations.

Dates/ Test	12/8	13/8	14/8	15/8	16/8	17/8	18/8	19/8	20/8	21/8	22/8	23/8	24/8	25/8	26/8
Hb (g/dl)	9.8	10.1	10.1	9.6	9.1	9.1	8.5	9.1	8.5	9.5	9.5		11.7		11.9
PCV (%)	29.3	30.4	30.0	28.6	27.5	27.8	26.1	28.0	26.1	28.9	29.3		35.7		35.8
WBC (Count/cmm)	5.4	5.2	5.5	6.4	8.4	9.7	9.3	8.6	10.1	12.0	12.3		14.0		13.1
Urea (mg/dl)	19	15	13	12	16	16	34	41	34	34	43			37	
Creatinine (mg/dl)	0.52	0.4	0.4	0.38	0.45	0.4	0.40	0.37	0.52	0.45	0.44			0.67	
Blood glucose	173	94	100	124	120	120	110	119	98	108	142	158	88	90	
PHOS (mg/dl)	2.2				2.4			4.0			3.9				
SGOT	49		88		74		30				25				
SGPT	13		21		28		22				20				
AST (U/L)															
ALT (U/62L)															
TBIL (mg/dl)	0.30		0.31		0.5		0.48				0.94				
DBIL (mg/dl)	0.19		0.1		0.11		0.19				0.22				
TP (g/dl)	4.7		5.0		5.2		5.3				5.8				
ALB (g/dl)	2.4		2.49		2.49		2.4	2.8			2.68				
CAL (mg/dl)	7.2				7.4			8.2			8.6				
ALP (U/L)	109		122		121		127				117				
MG (mg/dl)	1.81				2.08			2.06			2.06				
A/G															
Na ⁺ (mmol/l)	140	138	137	137	143	144	138	144	137	135	136			136	
K ⁺ (mmol/l)	3.43	3.82	3.69	3.76	3.24	3.85	4.05	4.80	4.42	4.47	3.97			4.97	
Cl (mmol/l)	108	107	103	102	106	104	98	92	100	99	101			93	
TSH (μUL/ml)	0.23						1.25								
PLT 10 ³ μL	166	157	162	156	169	164	143	146	195	237	302		403		394
PT/INR	12.5/ 1.15	11.4/ 1.04	11.7/ 1.06	11.3/ 1.03	11.6/ 1.06	12.1/ 1.10									
PTTK / ratio	78.3/ 2.53	42.6/ 1.54	42.9/ 1.55	40.5/ 1.47	39.3/ 1.42	50.0/ 1.81	12.8/ 1.16	45.0/ 1.63							

Table 2: Procalcitonin levels (marker of sepsis).

Date	12/8	14/8	15/8	17/8	18/8
Result (ng/ml)	0.10	0.09	0.10	0.09	0.07

X-ray Chest PA view was done which showed small opacities bilaterally. On subsequent day she developed difficulty in breathing and was not maintaining oxygen saturation (SPO₂=80%).

Initially she was managed with oxygen and NIV support and later intubated and mechanically ventilated for 16 hours. In spite of high ventilator support she was not able to maintain oxygen saturation thus was diagnosed as ARDS.

The chest X ray showed in homogenous haziness in right lower zone and left mid zone along with paracardiac

shadows. Echocardiogram showed normal systolic function with EF=60%.

Veno-venous ECMO was started after securing right femoral artery and right femoral vein with appropriate size cannula and adequate flow was maintained with centrifugal pump.

Inotropic support was gradually reduced and kept to minimum. Appropriate oxygenation was maintained through adequate pump flow.

The haemodynamic, metabolic and coagulation parameters were monitored strictly. Daily X-ray chest was done. Appropriate nutrition, physiotherapy and other supportive therapies were continued. Once oxygenation started improving the veno-venous ECMO support and mechanical ventilation was gradually weaned off.

Table 3: Investigations.

Investigation	Date	Results
Blood and body fluid culture	15.08.2017	Organisms isolated, no growth.
	22.08.2017	Organisms isolated, no growth.
Smear for gram staining	03.08.2017	Gram positive cocci in pairs (few), Pus cells (few)
Anti-HIV (CMIA)	12.08.2017	0.18 Non-reactive
Triage BNP per strip		32 pg/ml
Echo	22.08.2017	EF = 60% Normal LV size and systolic function
PBF	26.08.2017	Normocytic normochromic RBC picture, leucocytosis with neutrophilia seen. No toxic granules seen. Platelets are adequate in the smear examination.
USG chest	13.08.2017	Mild amount of pleural effusion along posterolateral chest wall bilaterally with underlying collapse/consolidation
USG abdomen	10.08.2017	Liver, GB, Pancreas, Spleen normal, B/L Kidneys: normal echogenicity, corticomedullary junction maintained, UB empty, Uterus: postpartum no Ascitis, minimal pleural effusion in left side noted
Chest X ray	12.08.2017	In homogenous haziness seen in right lower zone along para cardiac shadows. In homogenous haziness seen in left mid zone. Domes of diaphragm, bony thoracic cage grossly normal

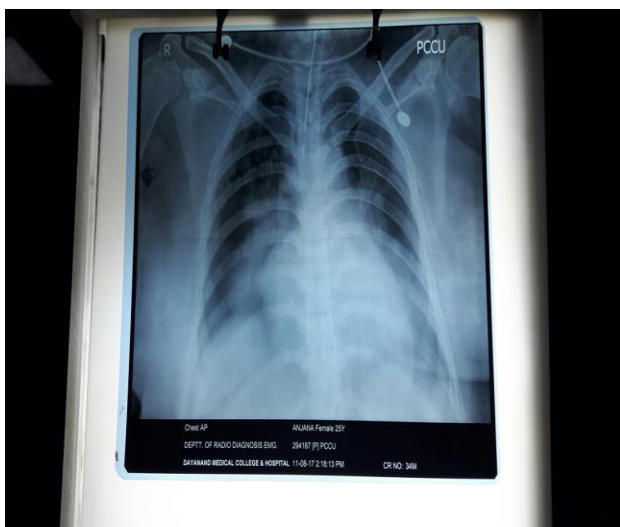


Figure 1: Chest X ray post-operative day 3.

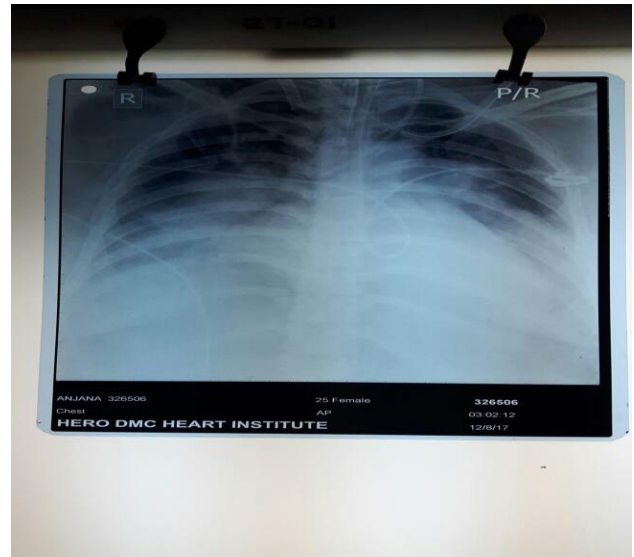


Figure 2: Chest X ray post-operative day 4.

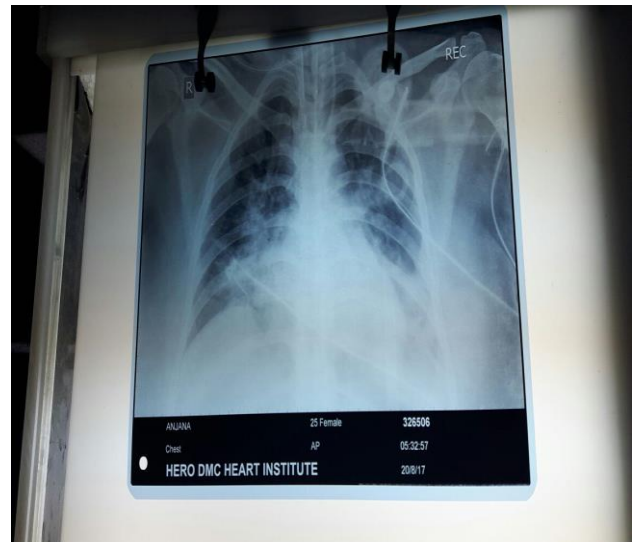


Figure 3: Chest X ray post-operative day 13.

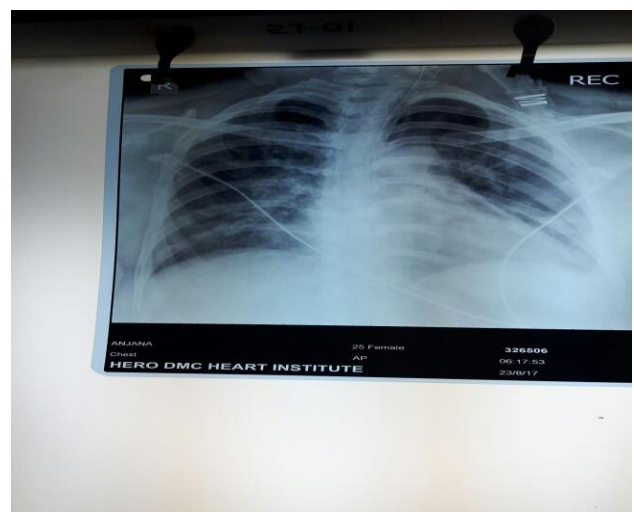


Figure 4: Chest X ray post-operative day 17.

DISCUSSION

A pregnant patient is at risk of developing acute lung injury from pregnancy-associated complications as well as other conditions. Acute respiratory distress syndrome (ARDS) is not uncommon in pregnancy and is a leading cause of maternal death.^{1,2,4} The pregnant state may predispose to the development ARDS by a number of mechanisms, including the increased circulating blood volume, the reduced serum albumin level, a possible upregulation of components of the acute inflammatory response and increased capillary leak.⁵

There are few differences in the management of the pregnant patient who has ARDS compared with one who is not pregnant. Survival from ARDS appears to be as good as or better than that in the general population, likely because of these patients' young age, lack of comorbidity, and the reversibility of many of the predisposing conditions, with an anticipated 40% to 75% survival rate.^{1,3,6}

The available modalities for the management of ARDS include noninvasive and invasive methods. Noninvasive methods like high flow oxygenation, i.v. fluids and antibiotics are the primary modality of management. However, when patients show difficulty in maintaining saturation invasive methods like mechanical ventilation are opted. Invasive modalities include Mechanical Ventilation, Airway pressure release ventilation, Positive end-expiratory pressure, prone position, fluid management, corticosteroids, nitric oxide, surfactant therapy and extracorporeal membrane oxygenation (ECMO). The mechanical ventilation has its own complications like barotrauma, pneumonitis, nosocomial infection.⁷⁻⁹ Therefore the present case is important as it highlights the importance of extracorporeal membrane oxygenation (ECMO) in the management of ARDS especially in post-partum period.¹⁰⁻¹²

CONCLUSION

Seeing the above case authors can say that ARDS can be a potential life-threatening complication in pregnancy and post-partum patients due to increased predisposition. ECMO can be a lifesaving tool in these cases. It is important to shift the patient to a tertiary care centre having ECMO facilities.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

1. Yildirim F, Kara I, Türk M, Kat I. Acute Respiratory Distress Syndrome due to Sepsis in Pregnancy. J Clin Respir Dis Care. 2016;2(114).
2. Ware LB, Matthay MA. The acute respiratory distress syndrome. N Engl J Med. 2000;342:1334-9.
3. Madershahian N, Nagib R, Wippermann J, Strauch J, Wahlers T. A simple technique of distal limb perfusion during prolonged femoro-femoral cannulation. J Card Surg. 2006;21(2):168-9.
4. Bernard GR, Artigas A, Brigham KL, Carlet J, Falke K, Hudson L, et al. The American-European Consensus Conference on ARDS. Definitions, mechanisms, relevant outcomes, and clinical trial coordination. Am J Resp Crit Care Med. 1994;149(3):818-24.
5. Ashbaugh D, Bigelow DB, Petty T, Levine B. Acute respiratory distress in adults. Lancet. 1967;290(7511):319-23.
6. Schwartz MI, Albert RK. "Imitators" of the ARDS: Implications for diagnosis and treatment. Chest 2004; 125:1530-5.
7. Smith JL, Thomas F, Orme Jr JF, Clemmer TP. Adult respiratory distress syndrome during pregnancy and immediately postpartum. Western J Med. 1990;153(5):508-10.
8. Proceedings of the 4th Margaux conference on critical illness: acute lung injury. Understanding the mechanisms of injury and repair. Sintra, Portugal, November 13-17, 2002. Crit Care Med. 2003;31(Suppl): S183-342.
9. Catanzarite V, Willms D, Wong D, Landers C, Cousins L, Schrimmer D. Acute respiratory distress syndrome in pregnancy and the puerperium: causes, courses, and outcomes. Obstet Gynecol. 2001;97(5):760-4.
10. Luce JM. Acute lung injury and the acute respiratory distress syndrome. Crit Care Med. 1998; 26:369-76.
11. Catanzarite VA, Willms D. Adult respiratory distress syndrome in pregnancy: report of three cases and review of the literature. Obstet Gynecol Surv. 1997;52:381-92.
12. Mabie WC, Barton JR, Sibai BM. Adult respiratory distress syndrome in pregnancy. Am J Obstet Gynecol. 1992;167(4):950-7.

Cite this article as: Juneja SK, Tandon P, Gupta V, Wander GS, Mahajan R, Singh A, et al. ECMO: a lifesaving modality in ARDS during puerperium. Int J Reprod Contracept Obstet Gynecol 2018;7:4285-8.