

Serological Evaluation of mucins in ovarian cancer

Amar Ranjan, Harshita Dubey, Pranay Tanwar
IRCH, AIIMS, New Delhi

Final Publication
Number: 152P

Introduction

Ovarian cancer (OC) is one of the most lethal cancer in females
No biomarker is available for early diagnosis
Mucin proteins (MUC) may be promising diagnostic biomarker
We evaluated serum levels of MUC1 and MUC4 for their diagnostic role

Material and methods

Pre-therapy whole blood sample was taken
31cases of OC & 8 benign ovarian cysts
Serum levels were measured for
MUC1 (CA 15-3), MUC4 & MUC 16 (CA 125)
Cut- off for MUC1 and MUC4 was set
141.3ng/mL and 1.206ng/mL respectively
Using ROC curve analysis
At highest sensitivity and specificity
Results were compared with CA125

Results

Serum level of MUC1 was **higher** in
33/39 (84.6%) cases
28/31 in malignant cases,
3/8 in benign cases
Serum level of MUC4 was **lower** in
33/39 cases
26/31 in malignant cases
5/8 in benign cases
CA125 was **higher** in
33/39 cases
28/31 in malignant cases
4/8 in benign cases (table 1)

Table 1: Positivity of all mucins in ovarian cancer

	No. of cases	Mucin 1		Mucin 4		CA125	
		+VE	-VE	+VE	-VE	+VE	-VE
All cases	39	33 (84.6%)	6 (15.3%)	6	33	33	6
Malignant cases	31	28	3	5	26	28	3
Benign cases	8	2	6	1	7	4	4

- ❑ Among histological variants of epithelial ovarian cancer,
- ❑ High levels of MUC1 was seen in **HGSC 16, Mucinous 4, Endometriod 3, clear cell 2**
p-value 0.567
- ❑ Lower value of serum level of MUC4 was associated with diagnostic indicator of ovarian cancer (p= 0.9709)
- ❑ Higher level of serum CA125 was associated with OC (p=0.0025),
Type 2 tumor (p= 0.0013),
advanced stage (p= 0.0087)
presence of omental metastasis (p= 0.0311)
Table 2: comparison of sensitivity & specificity of mucins

	CA125	MUC1	MUC4
Sensitivity	90.32%	90.32%	83.84%
Specificity	62.5%	50%	37.5%

- ❑ **MUC1 is over-expressed** in various carcinomas
- ❑ Detectable in the serum (8–10).
- High MUC1-expression was associated with
 - ovarian cancer in comparison to benign ones (5)
 - Higher histological grade
 - Advanced stage

- ❑ **MUC4 overexpression** is associated with
 - Early stage (14)
 - cancer cell survival, growth and invasion
 - Attenuates therapeutic effects of drugs
 - Confers resistance to cancer cell (23)

S.C.Chauhan et al 2006

- ❑ Studied Mucin1, 4 & 16 in OC.
- ❑ MUC4 overexpression in tumor cases
 - Highest incidence (92.0%) among all three mucins, (P<0.0001)
- MUC4 expression
 - significantly higher (P<=0.004) compared to both MUC1 and MUC16
 - Early-stage ovarian tumor
 - 100% incidence
- They showed that
 - MUC4 can detect early stage of ovarian cancer
 - Can be combined with MUC16 for higher sensitivity in late-stage cases (1)

Conclusion

- Serum level of Mucin 1 was increased in ovarian cancer
- Serum level of MUC4 was decreased in OC
- A combined panel of mucin 1, MUC4 and ca125 can aid in better diagnosis of OC

References

Lee DH, Choi S, Park Y, Jin HS. Mucin1 and Mucin16: Therapeutic Targets for Cancer Therapy. Pharmaceuticals (Basel). 2021 Oct 17;14(10):1053. doi: 10.3390/ph14101053. PMID: 34681277; PMCID: PMC8537522.

COI: I Amar Ranjan (presenting author) and Harshita Dubey (Corresponding author) have no

Conflict of Interest

Serological Evaluation of mucins in ovarian cancer

Amar Ranjan, Harshita Dubey, Pranay Tanwar
IRCH, AIIMS, New Delhi

Final Publication
Number: 152P

Introduction

- Ovarian cancer (OC) is one of the most lethal cancer in females
- No biomarker is available for early diagnosis
- Mucin proteins (MUC) may be promising diagnostic biomarker
- We evaluated serum levels of MUC1 and MUC4 for their diagnostic role

Material and methods

- Pre-therapy whole blood sample was taken
- 31cases of OC & 8 benign ovarian cysts
- Serum levels were measured for
 - MUC1 (CA 15-3), MUC4 & MUC 16 (CA 125)
- Cut- off for MUC1 and MUC4 was set
 - 141.3ng/mL and 1.206ng/mL respectively
 - Using ROC curve analysis
 - At highest sensitivity and specificity
 - Results were compared with CA125

Results

- Serum level of MUC1 was **higher** in
 - 33/39 (84.6%) cases
 - 28/31 in malignant cases,
 - 3/8 in benign cases
- Serum level of MUC4 was **lower** in
 - 33/39 cases
 - 26/31 in malignant cases
 - 5/8 in benign cases
- CA125 was **higher** in
 - 33/39 cases
 - 28/31 in malignant cases
 - 4/8 in benign cases (table 1)

Table 1: Positivity of all mucins in ovarian cancer

	No. of cases	Mucin 1		Mucin 4		CA125	
		+VE	-VE	+VE	-VE	+VE	-VE
All cases	39	33 (84.6%)	6 (15.3%)	6	33	33	6
Malignant cases	31	28	3	5	26	28	3
Benign cases	8	2	6	1	7	4	4

- ❑ Among histological variants of epithelial ovarian cancer,
- ❑ High levels of MUC1 was seen in **HGSC 16, Mucinous 4, Endometriod 3, clear cell 2**
p-value 0.567

- ❑ Lower value of serum level of MUC4 was associated with diagnostic indicator of ovarian cancer (p= 0.9709)

- ❑ Higher level of serum CA125 was associated with OC (p=0.0025),
Type 2 tumor (p= 0.0013),
advanced stage (p= 0.0087)
presence of omental metastasis (p= 0.0311)

Table 2: comparison of sensitivity & specificity of mucins

	CA125	MUC1	MUC4
Sensitivity	90.32%	90.32%	83.84%
Specificity	62.5%	50%	37.5%

- ❑ **MUC1 is over-expressed** in various carcinomas

- ❑ Detectable in the serum (8–10).
 - High MUC1-expression was associated with
 - ovarian cancer in comparison to benign ones (5)
 - Higher histological grade
 - Advanced stage

- ❑ **MUC4 overexpression** is associated with
 - Early stage (14)
 - cancer cell survival, growth and invasion
 - Attenuates therapeutic effects of drugs
 - Confers resistance to cancer cell (23)

S.C.Chauhan et al 2006

- ❑ Studied Mucin1, 4 & 16 in OC.
- ❑ MUC4 overexpression in tumor cases
 - Highest incidence (92.0%) among all three mucins, (P<0.0001)
- MUC4 expression
 - significantly higher (P<=0.004) compared to both MUC1 and MUC16
 - Early-stage ovarian tumor
 - 100% incidence
- They showed that
 - MUC4 can detect early stage of ovarian cancer
 - Can be combined with MUC16 for higher sensitivity in late-stage cases (1)

Conclusion

- Serum level of Mucin 1 was increased in ovarian cancer
- Serum level of MUC4 was decreased in OC
- A combined panel of mucin 1, MUC4 and ca125 can aid in better diagnosis of OC

References

Lee DH, Choi S, Park Y, Jin HS. Mucin1 and Mucin16: Therapeutic Targets for Cancer Therapy. Pharmaceuticals (Basel). 2021 Oct 17;14(10):1053. doi: 10.3390/ph14101053. PMID: 34681277; PMCID: PMC8537522.

COI: I Amar Ranjan (presenting author) and Harshita Dubey (Corresponding author) have no

Conflict of Interest