Research Article

Ovarian Malignancy Prediction by Gatot Purwoto (GP) Score, Risk Malignancy Index (RMI), and Frozen Section in Young Age

Prediksi Keganasan Ovarium dari Skor Gatot Purwoto (GP), Risk Malignancy Index (RMI), dan Potong Beku pada Usia Muda

Liva Wijaya, Fitriyadi Kusuma

Division of Gynecologic Oncology
Department of Obstetrics and Gynecology
Faculty of Medicine University of Indonesia/
Dr. Cipto Mangunkusumo General Hospital
Jakarta

Abstract

Objective: To know the diagnostic value of a scoring system taken before surgery and frozen section in young-aged patients with suspected malignancy. Using that result, we can also investigate whether frozen section gives additional value to clinical scoring system.

Method: This study is a diagnostic test. This study was carried out by accessing RSCM's medical record from 2006-2011. From 437 patients suspected of ovarian malignancy, we included 157 patients due to age.

Result: Diagnostic value of GP score are 77%, 49%, 61%, 68%, 63%, while RMI are 69%, 49%, 58%, 45%, 59%, (sensitivity, specificity, positive predictive value, negative predictive value, and accuracy respectively). Diagnostic value of frozen section in patients with suspected malignancy using GP score >4 are 81.7%, 87.2%, 90.7%, 75.6%, 83%, while in patients with RMI 200 are 81%, 87%, 89%, 77%, 83% (sensitivity, spesificity, positive predictive value, negative predictive value, and accuracy respectively).

Conclusion: Gatot Purwoto score and RMI have good diagnostic value in proving malignancy in young age. Its predictive value will be increased by frozen section.

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Keywords: frozen section, gatot purwoto score, ovarian malignancy, RMI, young age

Abstrak

***Tujuan**: Untuk mengetahui nilai diagnostik dari sistem skoring yang diambil sebelum operasi dan potong beku pada pasien usia muda yang diduga mengalami keganasan. Menggunakan hasil tersebut, kita bisa mengetahui apakah potong beku memberikan nilai tambah dari sistem skor tersebut.*

***Metode**: Merupakan uji diagnostik. Penelitian ini menggunakan rekam medik RSCM dari tahun 2006-2011. Dari 437 pasien yang diduga menderita keganasan, hanya 157 yang kami sertakan berdasarkan usianya.*

***Hasil**: Nilai diagnostik skor GP pada keganasan usia muda sebesar 77%, 49%, 61%, 68%, dan 63% berturut-turut untuk sensitivitas, spesifisitas, nilai duga positif, nilai duga negatif, dan akurasi sedangkan RMI memberikan nilai diagnostik berturut-turut 69%, 49%, 58%, 45%, dan 59%, hasil yang tidak jauh berbeda dengan skor GP. Nilai diagnostik prosedur potong beku pada keganasan usia muda dengan skor GP >4 adalah 81,7%, 87,2%, 90,7%, 75,6%, dan 83% berturut-turut untuk sensitivitas, spesifisitas, nilai duga positif, nilai duga negatif, dan akurasi sedangkan untuk RMI 200 nilai diagnostik berturut-turut adalah 81%, 87%, 89%, 77%, dan 83%.*

***Kesimpulan**: Skor GP dan RMI dapat digunakan pada pasien usia muda. Hasil prediksi akan meningkat bila ditambah dengan potong beku.*

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***Kata kunci**: keganasan ovarium, potong beku, RMI, skor GP, usia muda*

Correspondence: Liva Wijaya, Department of Obstertics and Gynecology Faculty of Medicine University of Indonesia/ Dr. Cipto Mangunkusumo Hospital Jakarta, Phone 08122055012, email bugmd13@yahoo.com

INTRODUCTION

According to the American Cancer Society, gynecologic tumors are among the ten most common malignancies representing 12-15% of all cancers in women.[1] Ovarian cancer is the sixth most frequent cancer in Indonesia. Forty percent of gynecologic malignancy is contributed by ovarian cancer.[2] Recent advances in cancer therapy have resulted more long-term cancer survivors. Standard surgery for early-stage invasive epithelial ovarian cancer or other ovarian malignancies includes hysterectomy, bilateral salpingo-oophorectomy, omentectomy, random peritoneal biopsies and assessment of retroperitoneal lymph nodes. For young women with stage I epithelial ovarian cancer and favorable histology, fertility-sparing surgery (FSS) preserving the uterus and the contralateral ovary may be an option.[3] Published data on fertility outcome after FSS has reported successful pregnancies[4-7] with

conception rates ranging between 30% and 50%, supporting the notion that conservative surgery with comprehensive staging does not impair reproductive potential.[5,8] Only a small number of reported patients needed assisted reproductive techniques.[8] Taking this into consideration, predicting malignancy before surgery and intra-surgery is an important thing. Nowadays, we have qualified pre-surgery diagnostic tools like Gatot Purwoto (GP) score that was established in Dr. Cipto Mangunkusumo hospital (RSCM) and Risk Malignancy Index (RMI). Both of them have good value to predict ovarian malignancy with sensitivity varying between 58%-90%. Candidates of FSS are young women who have different prevalence of ovarian malignancy type. Both of the pre-surgery scores mentioned above are appropriate for epithelial ovarian cancer. Very few studies have emphasized the predictive value of pre-surgery score in young women. As an intra-surgery diagnostic tool, frozen section is considered to increase predictive value of pre-surgery diagnostic tools. The aim of this study is to investigate the diagnostic value of scoring system taken before surgery and frozen section in young age patients with suspected malignancy. Using this result, we can also investigate whether frozen section give additional value to clinical scoring system.

METHODS

This study was done retrospectively using medical records of RSCM patients with suspected malignancy in 2006-2011. This study is a diagnostic test. We included patients aged 15-40 years old with suspected ovarian malignancy and excluded patients who were pregnant, had history of gynecologic surgery or anomalies, had history of liver anomaly or systemic disease, already proven to have ovarian malignancy, and patients with incomplete data. We analyzed the data using SPSS program from Windows.

Patients who matched the inclusion and exclusion criteria will be analyzed. Using data from young-aged patients suspected of ovarian malignancy, we assessed the diagnostic value of GP score and RMI. Diagnostic value of frozen section was measured from patient data with GP score > 4 and RMI 200. From that calculation, we can understand the additional diagnostic value of frozen section after utilization of pre-surgery tools.

RESULTS AND DISCUSSION

We obtained data of 437 patient diagnosed with cystic ovarian neoplasm. Of those patients, 157 were under 40 years old with the youngest patient aged 12 years old. Two patients were excluded due to incomplete data. Patients aged 45 years or younger have a better prognosis compared with older patients (72% versus 32% 5-year overall survival respectively). Young age has already been reported as a favorable prognostic factor in patients with ovarian cancer.[9,10] Considering that 40 years old is the age limit for successful assisted fertilization, it was chosen as our inclusion criteria.

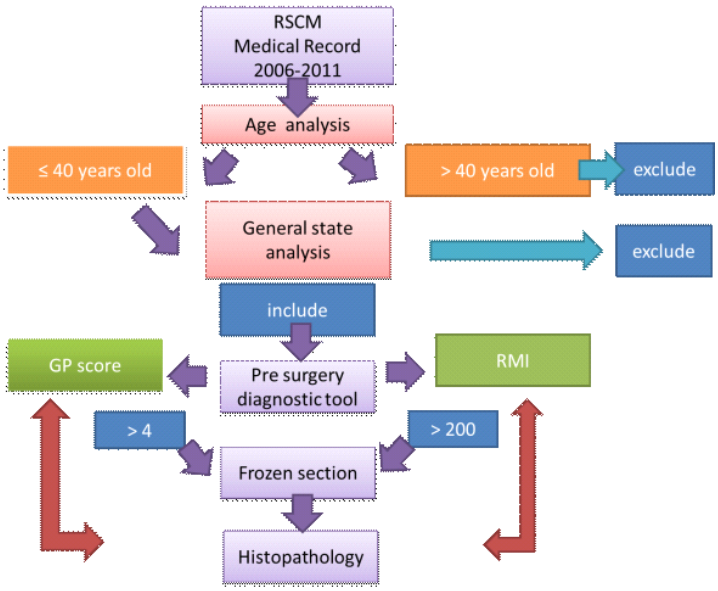

Figure 1. Study design

Most patients were 40 years old (34 patients). The age distribution will take control the result of this research. As we know that in young-aged patients who preserve fertility are more likely to have germ cell type, in which pre-surgery score is less sensitive, contrasting with our study results.

Due to most patients being 40 years old, epithelial type was the dominant type of neoplasm. As stated by Aslam and Massuger, RMI precisely diagnosed invasive epithelial type. Gatot Purwoto has also proven that GP score had good value to prove epithelial type ovarian malignancy.[11]

This result represents common ovarian cancer population where 90% of ovarian cancer is caused by epithelial type.[12-14] Theoretically, based on age distribution, most cancer in young age are non epithelial type (30-70%). This unmatched result could be due to our sample distribution. The youngest subject was 12 years old. We could not obtain subjects younger than 12 years old since most of them were consulted to pediatric department.

Seventy nine percent and 60% of patients were suspected to have malignancy by GP score and RMI respectively, but only 38% and 40% were proved to be malignant. Eighteen percent of malignancy cases were comprised of non-epithelial type ovarian malignancy, most of which were germinal type cancer. Overall, histopathology results showed 60% of cases were epithelial type, 21% were germ cell type, 13% were other benign ovarian tumors, and 6% were non-ovarian tumor. Sixty percent of non-epithelial type was malignant and 82% of epithelial type was confirmed to be cancer. Based on that, we obtained the diagnostic value of GP Score and RMI as shown in Table 2.

Table 1. Patient Characteristics.

Pre-surgery diagnosis	**n**	**Percent (%)**
Cystic ovarian neoplasm suspected malignant	125	79.6
Ovarian neoplasm	10	6.4
Ovarian neoplasm with solid part	13	8.3
Multilocular cystic ovarian neoplasm suspected mucinous type	1	0.6
Cystic ovarian neoplasm GP > 4	7	4.5
Intraabdominal tumor with differential of cystic ovarian neoplasm	1	0.6
Definitive diagnosis	**n**	**Percent (%)**
Endometrial adenocarcinoma	1	0.6
Ovarian carcinoma	53	33.8
Borderline ovarian tumor	25	15.9
Germ cell tumor	16	10.1
Ectopic pregnancy	2	1.3
Benign ovarian cyst	33	20.9
Mucinous ovarian cystadenoma	11	7.0
Serous ovarian cystadenoma	3	1.9
Subserous and intramural uterine fibroid	2	1.3
Solid ovarian neoplasm	1	0.6
Carcinomatosis peritoneum dd/lung TB	5	3.2
Granulose cell tumor	3	1.9
M. obliquus internus and rectal tumor	1	0.6
Mesenchymal tumor	1	0.6
TOTAL	157	

Table 2. Diagnostic Value of GP Score and RMI.

Diagnostic Value	GP Score	RMI
Sensitivity	76%	69%
Specificity	49%	49%
PPV	61%	58%
NPV	68%	45%
Accuracy	63%	59%

The result of both score was comparable to prove malignancy. Compared with Gatot Purwoto's data, the result from GP score in this paper is not as much as the original data. It could be due to the different epidemiologic data. Prediction made by RMI is comparable with earlier studies where sensitivity ranged from 58%-90% in proving malignancy.

Despite its limitations, frozen section is an important and reliable tool in the clinical management of patients with ovarian tumors. However, little information has been published concerning the utilization of frozen section in ovarian lesions. In previous literature, the reported frozen section utilization ratio for ovarian lesions range from 7.4% to 47%.[15] Principally, frozen section had good diagnostic value. Previous research showed the sensitivity of frozen section to be 60-97%. The accuracy of frozen section diagnosis in general surgical practice is reported to vary from 91.5 to 97.4%.[16] In this study, frozen section obtained higher predictive value than pre-surgery score with sensitivity, specificity, PPV, NPV, and accuracy were 79%, 92%, 91%, 82%, and 85% respectively. The results were much higher in patients with suspected malignancies. Patients with GP score > 4 got better prediction where sensitivity, specificity, PPV, NPV, and accuracy were 82%, 87%, 91%, 75%, and 83%. In patients with RMI 200, frozen section gave similar results, which were 81%, 87%, 89%, 77%, and 83% for sensitivity, specificity, PPV, NPV, and accuracy respectively.

The additional value given by frozen section was only 6% for GP score and 12% for RMI score. Ovarian cancer has the highest fatality-to-case ratio of all gynecologic cancers since less than 40% of cases are diagnosed in early-stage disease.[17] The lack of early symptoms and an effective screening method when tumor is confined to the ovaries, as well as the absence of sensible tumor markers and imaging techniques at early stages are the main reason of this high rate of diagnosis at late stages. This pre-surgery score and frozen section provide the chance for a better diagnosis and subsequently better management. We have to make adjustments for young-aged patients to get better predictive value.

CONCLUSION

GP score and RMI provide good diagnostic value in proving malignancy in young age. Its results will be increased by frozen section.

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