



High Frequency of Malignant Transformations on Ovarian Mature Teratomas at a Single University Hospital, Jakarta, Indonesia (2015–2018)

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Abbreviations

MT	Mature teratoma
FIGO	International Federation of Gynecology and Obstetrics
CT-SCAN	Computed tomography scan
MRI	Magnetic resonance imaging
ECOG	Eastern Cooperative Oncology Group
CP	Carboplatin and paclitaxel
BEP	Bleomycin, etoposide, and platinum
FOLFOX	Folinic acid, 5-fluorouracil, and oxaliplatin

Short Commentary

Mature teratoma (MT) is a cystic or solid tumor consisting of adult tissues with resembling epidermis tissues and its appendages on the border. It is the most common type of benign ovarian mass (58% of all benign ovarian tumors and 27–44% of all ovarian tumors) with malignant transformation rates varying from 1 to 6.6% [1, 2]. The aim of this study was to provide a description of the malignant transformations of MTs at a single university hospital in Jakarta, Indonesia, within 5-year interval (January 2015–December 2018) at a single university hospital in Jakarta, Indonesia.

High frequency of malignant transformation MTs was observed (13 over 84MTs, 15.48%). The median age of the patients was 36.5 years (range 26–63) younger than most of the studies shown in Table 1. Patients who were originally from our hospital had a good performance score (ECOG 1) at the time of admission and before an operation. On the contrary, referred patients from other hospitals came with poorer conditions (ECOG 3) and with advanced stage of the disease preoperatively. All patients came with presenting symptoms of an abdominal palpable mass, ranging from 3 to 28 cm (mean 15 cm considerably higher than other studies). Eight over 13 patients were staged as advanced ovarian carcinoma (FIGO IIA 1 patient, IIIC 6 patients, and IVB 1 patient). Five patients presented with stage IA. Chemotherapy was assigned to some advanced ovarian cancer, 1/8 had BEP regimen, 3/8 had CP, and there was only one patient who completed the full course.

The histopathology reported some different transformation; squamous cell carcinoma being the common type (4/13 patients), followed by the mucinous type and thyroid type. Pseudomyxoma condition was also reported in 2 patients. Figure 1 shows the MT features and the malignant transformation in one patient (case no. 8). The figure shows the alteration of squamous malignancy among the benign features. Two out of three mucinous carcinoma transformation were complicated with pseudomyxoma. Figure 2

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Table 1 Studies of malignant transformation on mature teratomas (2015–2019)

No	Study, country, study, year	Malignant transformation/total MT (%)	Median age (years)	Mean tumor size (cm)	Common type
1	Oranratanaphan et.al. Thailand, Asian Pac J Cancer Prev 2013	11/753 (1.5%)	41*	14.0	SCC
2	Koc et.al. Turkey, J Exp Ther Oncol 2015	18/NA (0, 4%)	48	NA	SCC
3	Park et.al., Korea, Obstet Gynecol 2015	6/248 (2.4%)	43*	11.4	SCC
4	Black J et.al. USA, Int J Gynecol Cancer 2015	9/729 (1.2%)	58	18.0	SCC
5	Desouki et.al., USA, Ann Diagn Pathol 2015	11/956 (1.2%)	49*	11.2	SCC
6	Duffy et. al. UK, Eur J Obstet Gynecol Reprod Biol 2015	16/1082 (1.5%)	36	NA	NA
7	Al-Wazzan et. al. Manitoba, Eur J Gynecol Oncol 2016	13/NA	53	NA	SCC
8	Rathore et.al. India, Prz Menopausalny 2018	8/230 (3.5%)	44	11.7	SCC
9	Guerrieri et.al. Italy, Anticancer 2018	3/206 (1.5%)	48	10 (19, 4, and 7)	SCC
10	Utami TW et al. Jakarta, 2020	13/84 (15.48%)	36	15	SCC

NA not available, SCC squamous cell carcinoma

*mean

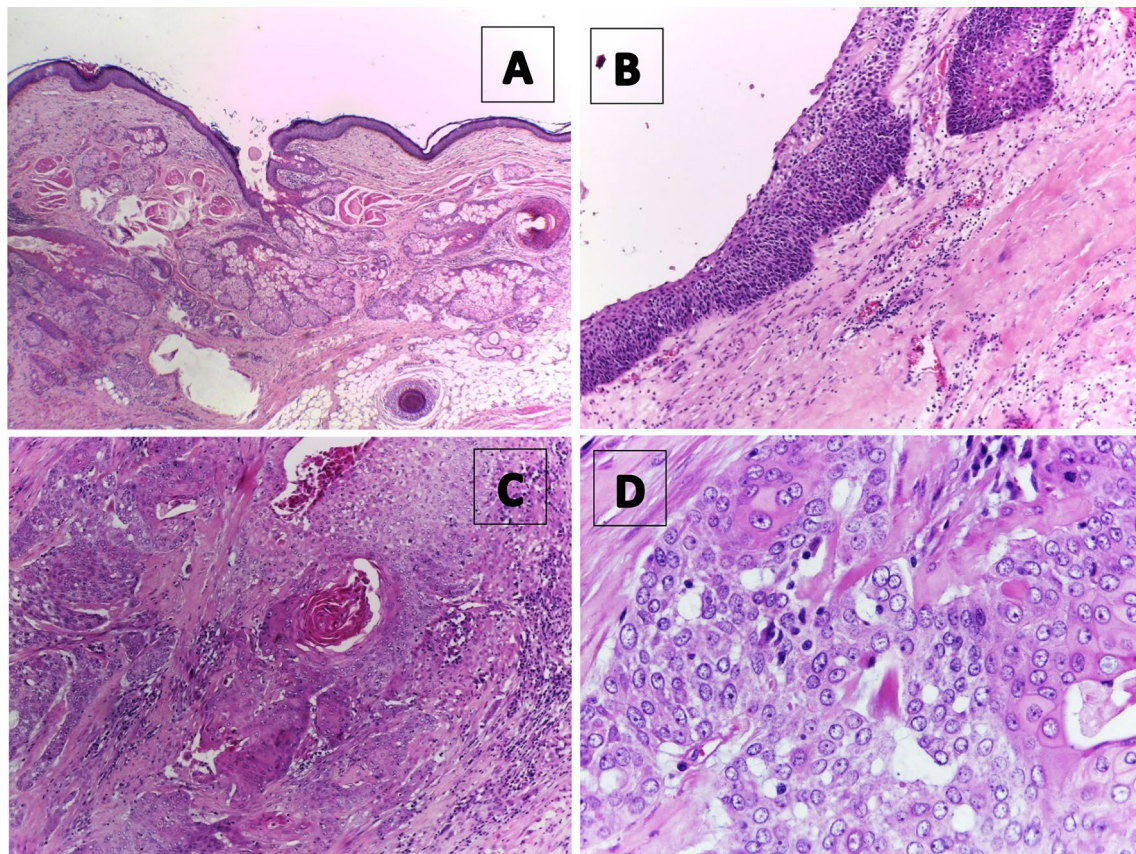


Fig. 1 Microscopic specimens of squamous cell carcinoma on mature teratoma with hematoxylin and eosin case no. 6: **a** on magnification 4 x, **b** on magnification 10x, **c** on magnification 40x, and **d** on magnification 100x

shows various types of malignant transformation within our institution.

The early stage was established by full staging in 4 out of 6 cases, although it remains debatable whether full staging

was always necessary in these cases. Fertility sparing surgery has been reported to have no difference in long-term oncological outcome from radical surgery for stages I and II who hope to have fertility preservation. This study showed

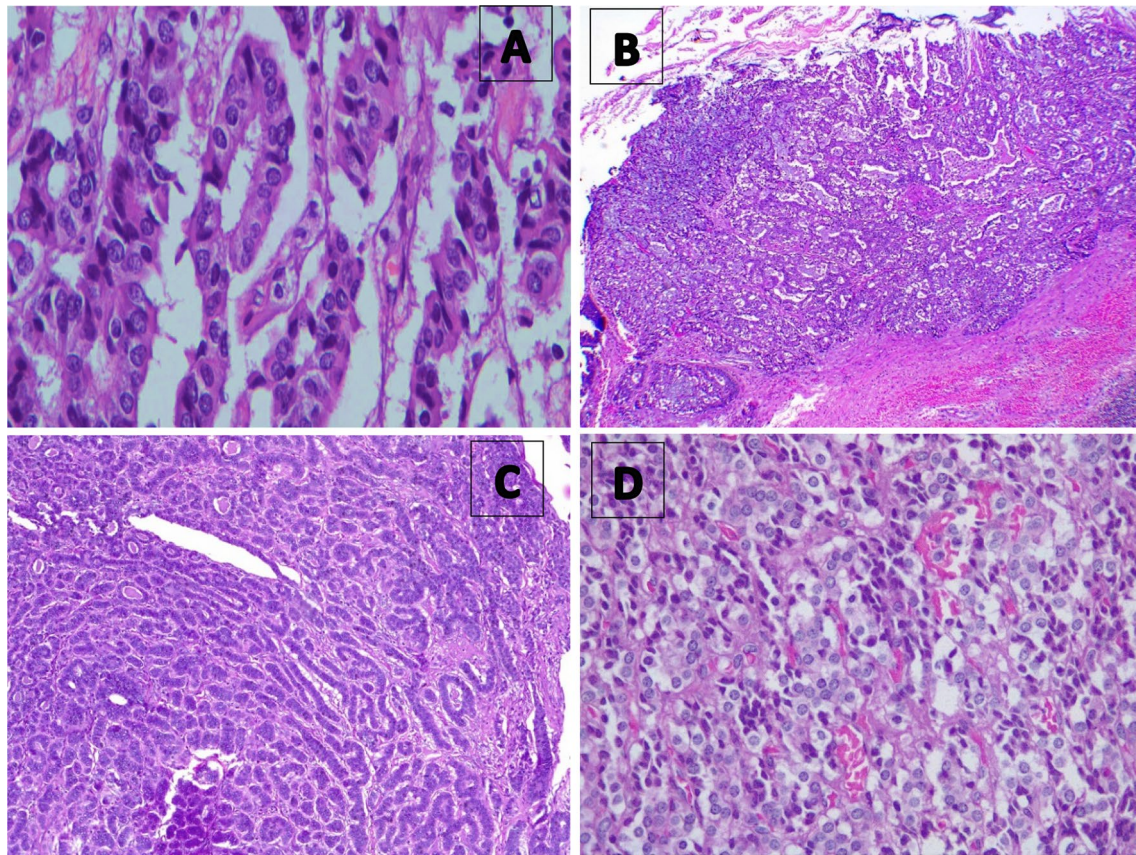


Fig. 2 Microscopic specimens of malignant transformation on mature teratoma and hematoxylin- and eosin-stained; **a** squamous cell carcinoma—case no. 3 (100x), **b** mucinous adenocarcinoma—case no. 4

(10x), **c** carcinoid—case no. 5 (10x), **d** papillary thyroid carcinoma case no. 6 (40x)

that patients with malignant transformation of MT also presented at later stages like other ovarian cancer. Only 5/13 patients had tumor limited to the ovary. Adjuvant therapy in early and/or completely resected cases is highly controversial as most of the histopathology types are relatively chemoresistant [2, 3]. The most common malignant transition, squamous carcinoma, has a very good prognosis if limited to the ovary and operated without a spill. Therefore, it does not need adjuvant treatment, although this was given in the one case in the series. All 4 patients with stage IA and IIA diseases that were treated only with surgery have no evidence of disease until now. In advanced cases, adjuvant chemotherapy is most probably palliative both in completely and in incompletely resected cases. Also, the 2 cases for advanced disease which were reported died of disease. The choice of chemotherapy regimen was either TC or BEP. Other study reported that combination chemotherapy of folinic acid, 5-fluorouracil, and oxaliplatin (FOLFOX) could benefit patients with mucinous adenocarcinoma [4].

Nine publications were systematically reviewed to provide a comprehensive assessment of the prevalence and

characteristics of the malignant transformations of MTs (Table 1) [5]. Besides having a high prevalence of malignant transformations on mature teratomas, this study indicated a younger age and similar increasing risk on large ovarian tumors. Even though the squamous cell carcinoma was the main type of transformation, the mucinous type was also high and presented with systemic complications such as pseudomyxoma peritonei with poor prognosis.

Authors Contributions All authors have read and approved the manuscript. TWU interpreted the data regarding the malignant transformation of the mature teratoma and writing the manuscript; HMARP performed the data collection, co-author the manuscript, and corresponding author; TH performed the histological examination and pointed out the importance of the histological results.

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Compliance with Ethical Standards

Conflict of interest No conflict of interest.

Ethics Approval Ethics approval was obtained from the Ethics committee of the Faculty of Medicine, University of Indonesia (attached ethical approval letter); No. KET-498/UN2.F1/ETIK/PPM.00.02/2019 and Protocol Number: 19–05-0531.

Availability of Data and Material Data and materials were available in the Case Report Form of Dr. Cipto Mangunkusumo Hospital.

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Tofan Widya Utami received Doctoral degree from the University of Indonesia, Jakarta-Indonesia. She is currently a senior lecturer and researcher at the same university. Being gynecologic oncologist at the university hospital, her research interests include clinical and biomedical research of gynecologic cancer.