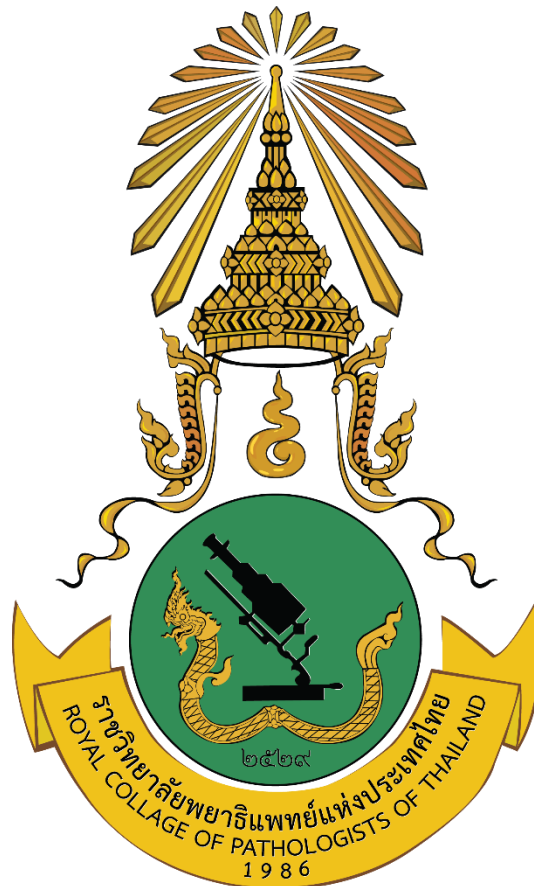


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ABOUT THE JOURNAL

Aims and Scope

Asian Archives of Pathology (AAP) is an open access, peer-reviewed journal. The journal was first published in 2002 under the Thai name “วารสารราชวิทยาลัยพยาธิแห่งประเทศไทย” and English name “Journal of the Royal College of Pathologists of Thailand”. The journal is a publication for workers in all disciplines of pathology and forensic medicine. In the first 3 years (volumes), the journal was published every 4 months. Until 2005, the journal has changed its name to be “Asian Archives of Pathology: The Official Journal of the Royal College of Pathologists of Thailand”, published quarterly to expand the collaboration among people in the fields of pathology and forensic medicine in the Asia-Pacific regions and the Western countries.

The full articles of the journal are appeared in either Thai or English. However, the abstracts of all Thai articles are published in both Thai and English languages. The journal features letters to the editor, original articles, review articles, case reports, case illustrations, and technical notes. Diagnostic and research areas covered consist of (1) **Anatomical Pathology** (including cellular pathology, cytopathology, haematopathology, histopathology, immunopathology, and surgical pathology); (2) **Clinical Pathology (Laboratory Medicine)** [including blood banking and transfusion medicine, clinical chemistry (chemical pathology or clinical biochemistry), clinical immunology, clinical microbiology, clinical toxicology, cytogenetics, parasitology, and point-of-care testing]; (3) **Forensic Medicine (Legal Medicine or Medical Jurisprudence)** (including forensic science and forensic pathology); (4) **Molecular Medicine** (including molecular genetics, molecular oncology, and molecular pathology); (5) **Pathobiology**; and (6) **Pathophysiology**.

All issues of our journal have been printed in hard copy since the beginning. Around the late 2014, we developed our website (www.asianarchpath.com) in order to increase our visibility. We would like to acknowledge that our journal has been sponsored by the Royal College of Pathologists of Thailand. We have the policy to disseminate the verified scientific knowledge to the public on a non-profit basis. Hence, we have not charged the authors whose manuscripts have been submitted or accepted for publication in our journal.

On the other hand, if any authors request a printed copy of the journal issue containing the articles, each of the copied journals costs 450 bahts for Thai authors and 30 United States dollars (USD) for international authors.

Publication Frequency

Four issues per year

Disclaimer

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LETTER TO THE EDITOR

ความสัมพันธ์ระหว่างดัชนีการพยากรณ์โรคมะเร็งเต้านม
ของน็อตติงแฮมกับการแสดงออกทางอิมมูโนฮิสโตเคมี
[The correlation between
Nottingham prognostic index (NPI) and
immunohistochemical expression]

ศุภกร ปิยะอิสรากุล

กองพยาธิกรรม โรงพยาบาลภูมิพลอดุลยเดช เลขที่ 171 ถนนพหลโยธิน แขวงคลองถนน เขตสายไหม
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มะเร็งเต้านมในแต่ละชนิดทางโมเลกุล (Molecular subtypes) จะมีค่าดัชนีการพยากรณ์โรคมะเร็งเต้านมของน็อตติงแฮม [Nottingham prognostic index (NPI)] ที่แตกต่างกัน⁽¹⁾ โดยเฉพาะมะเร็งเต้านมชนิด HER2-positive และ Triple-negative จะมีค่า NPI ที่สูงกว่ามะเร็งเต้านมชนิด Luminal⁽²⁾ ทั้งนี้จากรายงานผลการศึกษาของ Kurshumliu และคณะในปี พ.ศ. 2557 (ค.ศ. 2014) โดยใช้เนื้อเยื่อมะเร็งเต้านมชนิดคาร์ซิโนมา (Breast carcinoma) จากผู้ป่วยสตรีจำนวน 120 รายพบว่า ระดับค่า NPI ยังมีความสัมพันธ์กับผลการแสดงออกทางอิมมูโนฮิสโตเคมี [Immunohistochemistry (IHC)] ของโปรตีน ER, PR, HER2, Ki67 [Proliferative index (PI)], p53 และ Bcl-2 ในเนื้อเยื่อมะเร็งเต้านมอีกด้วย โดยเนื้อเยื่อมะเร็งเต้านมที่มีการแสดงออกของโปรตีน ER, PR, Bcl-2 และ Ki67 < 14% (ค่า PI ต่ำ) มักจะมีค่า NPI ในระดับที่ไม่เกิน 5.40 ส่วนเนื้อเยื่อมะเร็งเต้านมที่มีการแสดงออกของโปรตีน Ki67 ≥ 14% (ค่า PI สูง) มักจะมีระดับค่า NPI มากกว่า 5.40 นอกจากนี้แล้วเนื้อเยื่อมะเร็งเต้านมที่มีการแสดงออกของโปรตีน HER2 เป็นผลบวกจะมีค่า NPI ที่แตกต่างอย่างมีนัยสำคัญเมื่อเปรียบเทียบกับเนื้อเยื่อมะเร็งเต้านมที่ไม่มีการแสดงออกของโปรตีน HER2 กล่าวคือ ร้อยละ 11.67 ของผู้ป่วยมะเร็งเต้านมปฐมภูมิชนิดรุกราน (Primary invasive breast cancer) ที่มีค่า NPI มากกว่า 5.40 จะมีการแสดงออกทาง IHC ของโปรตีน HER2 ในเนื้อเยื่อมะเร็งเต้านมเป็นผลบวก อย่างไรก็ตามการศึกษานี้พบว่าไม่ปรากฏความสัมพันธ์อย่างมีนัยสำคัญทางสถิติระหว่างค่า NPI กับการแสดงออกของโปรตีน p53 ในเนื้อเยื่อมะเร็งเต้านม⁽³⁾ สำหรับมะเร็งเต้านมชนิด Triple-negative นั้นถึงแม้ว่าจะไม่ปรากฏการแสดงออกทาง IHC ของโปรตีน ER, PR และ HER2 แต่ระดับค่า NPI ก็ยังสามารถนำมาใช้เพื่อการพยากรณ์โรคในผู้ป่วยมะเร็งเต้านมกลุ่มนี้ได้เป็นอย่างดี⁽⁴⁾

แม้กระนั้นก็ตามในปี พ.ศ. 2554 (ค.ศ. 2011) Mudduwa ได้ทำการศึกษาโดยใช้เนื้อเยื่อมะเร็งเต้านมของผู้ป่วยจำนวน 67 รายแล้วพบว่า ผู้ป่วยมะเร็งเต้านมที่มีระดับค่า NPI มากกว่า 3.40 จะมีโอกาสปรากฏการแสดงออกของโปรตีน HER2 เป็นผลบวกในเนื้อเยื่อมะเร็งเต้านมได้ถึงร้อยละ 83.3 [ความไว (Sensitivity)] สำหรับผู้ป่วยมะเร็งเต้านมที่มีระดับค่า NPI น้อยกว่าหรือเท่ากับ 3.40 จะมีโอกาสที่ไม่พบการแสดงออกของโปรตีน HER2 ในเนื้อเยื่อมะเร็งเต้านมได้ประมาณร้อยละ 26.5 [ความจำเพาะ (Specificity)] ซึ่งการศึกษานี้ยังพบด้วยว่าหากนำค่า NPI ที่มากกว่า 3.40 มาใช้เพื่อคาดการณ์ว่าเนื้อเยื่อมะเร็งเต้านมมีการแสดงออกทาง IHC เป็น HER2-positive นั้นจะมีความแม่นยำ (Accuracy) เพียงร้อยละ 41.79⁽⁵⁾ ทั้งนี้ Shivakumar และคณะได้รายงานผลการศึกษาในเนื้อเยื่อมะเร็งเต้านมของผู้ป่วยจำนวน 50 รายที่เป็นไปในทางที่สอดคล้องกันว่า การแสดงออกทาง IHC ของโปรตีน HER2 ในเนื้อเยื่อมะเร็งเต้านมไม่มีความสัมพันธ์อย่างมีนัยสำคัญกับระดับค่า NPI⁽⁶⁾

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ORIGINAL ARTICLE

Physicians' knowledge, attitude and practices towards autopsy in a Nigerian tertiary hospital

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Abstract

The post-mortem examination is a hospital service necessary to diagnose the cause and circumstances surrounding patients' death. This study assessed the knowledge, attitude and practices of physicians towards autopsy. Descriptive cross-sectional study of physicians that completed a semi-structured questionnaire assessing their knowledge, attitude and practices towards autopsy. Data collected were analysed. A total of 206 physicians participated. Most were young (69.4%), resident doctors (81.6%), in surgical specialties (52.9%) and Christians (72.8%). Majority had good knowledge (91.7%), positive attitude (81.1%) and positive practices (81.6%) of autopsy. Significant variables associated with good autopsy practices include age 35 years and above (OR = 3.23, 95% CI = 1.56-6.67, $p = 0.002$), Christianity (OR = 4.69, 95% CI = 2.24 – 9.84, $p < 0.001$) and positive attitude (OR = 21.15, 95% CI = 8.91 – 50.25, $p < 0.001$). Some physicians had poor knowledge, negative attitude and poor practices to autopsy. These physicians should be targeted in trainings on autopsy practices.

Keywords: attitude; autopsy services; knowledge; physicians; practices

Introduction

The autopsy or post-mortem examination is the gold standard of unravelling the mysteries about patients' health when fatalities occur⁽¹⁻³⁾. It involves the systemic dissection of the patient's corpse after death exclusively for medical and medico-legal reasons^(4,5). The autopsy is done to establish the cause of death, detecting lesions that were not obvious on clinical examination and investigations, ascertaining the exact progression of the disease, proper staging of diseases such as malignancies, clarifying diagnostic controversies especially when reports of investigations vary and seem to contradict one another and confuse or confound the managing team^(6,7). Autopsies also help to resolve relatives' doubts about the management of their deceased loved ones^(8,9). Though the benefits of the autopsy seem interminable, there has been reduction in the rates of autopsy request by clinicians worldwide in the last three decade particularly⁽⁹⁻¹¹⁾. Reasons adduced for the decline include the over-reliance of clinicians on the over-hyped versatility of the investigative capacity of the modern sophisticated medical equipment such as computerised axial tomography scanning and medical resonance imaging equipment, the certainty of diagnoses by medical experts, non-assent by relations, religious prejudices and poor communication between the clinicians and the pathologist⁽¹²⁻¹⁴⁾. There is also the subtle fear of medical litigations arising from autopsy revelations of misdiagnoses, missed diagnoses, clinical negligence and medical malpractice^(15,16). The assumed judicial role by the self-righteous pathologist with inflated academic pride to criticise and condemn the clinicians has also caused irritable withdrawal by clinicians demonstrated by failure to request for post-mortem examinations even in coroner's cases^(16,17). The poor attitude of some pathologists to conduct autopsies with due diligence and generate a post-mortem correspondence to address the reservations of the clinicians has also led to the lack of interest in the autopsy by the clinicians^(17,18). The failure of clinicians to request for clinical autopsies has resulted in sharp reductions in the conduct of autopsies by pathologists in many jurisdictions with resultant poor knowledge of the role of post-mortem examination in the care of patients among healthcare providers, undergraduates, physicians in training, postgraduate students of the health professions, young medical specialists and of course has emboldened the ignorance of the lay public^(18,19). The result of the reduction in refusing to request, assessing and conducting post-mortem examination is an evidence of the failure of clinical systems pathology⁽¹⁹⁾. Clinical systems pathology enables the rational design and testing of effective personalised predictive medical intervention and preventive measures for optimum patient centered care⁽²⁰⁾.

This study assessed the knowledge, attitude and practices of physicians working at the Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, Nigeria to autopsy.

Materials and Methods

Study location:

This is a descriptive cross-sectional study of physicians working at the Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, Nigeria. The hospital has several medical, surgical, laboratory departments including the Department of Morbid Anatomy and Forensic Medicine with full complements for histopathology, toxicology and forensic autopsy including embalment services. The hospital serves as a referral centre for Osun State and other States in the South western part of Nigeria and beyond.

Study design:

The study population include physicians working at the Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, Nigeria.

Inclusion criteria:

Inclusion criteria were all physicians working at the various clinical departments including the emergency, clinics and wards.

Exclusion criteria:

Exclusion criteria were physicians who did not consent to participate or who were not on duty during the study period.

Sample size calculation:

The sample size of 100 was calculated using an appropriate statistical formula for descriptive health studies [$n = Z^2 pq/d^2$] with 12.5% physicians previously consented to autopsy and non-responders were taken into consideration^(7,21).

Ethical considerations:

Eligible physicians after an informed consent completed a self-administered pretested semi-structured questionnaire that assessed autopsy knowledge, attitude and practices. The physicians were allowed to complete the questionnaire in their spare time at their convenience. Questionnaire information were anonymised.

The ethical approval was obtained from the Ethics and Research Committee of the Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, Nigeria.

Statistical analysis:

Data obtained were analysed using SPSS version 16. Simple descriptive and inferential statistics were done. Test of significance was conducted using appropriate statistical methods. Bivariate regression analysis was performed to evaluate socio-demographic variables and other variables that are independently associated with good autopsy practices. Odd ratio (OR) and 95% confidence interval (CI) were presented and used as measures of the strength of association. Significant level was put at $p < 0.05$.

Results

Out of 300 physicians approached to participate in the study, 16 declined, 37 did not return their questionnaire while 41 questionnaires were not included in analysis because of non-completeness. A total of 206 questionnaires with completed data were analysed (response rate 68.7%). The mean age of the study participants was 31.8 years, range 25 – 49 years. Most were young (69.4%), resident doctors (81.6%), in surgical (52.9%) and medical (47.1%) specialties. Most (54.9%) were married and Yoruba (81.1%). There were 150 (72.8%) Christians and 56 (27.2%) Muslims (*Table 1*).

Table 1 Socio-demographic characteristics of physicians.

Variable	Frequency (n = 206)	%
Age group (years)		
25 – 34	143	69.4
≥ 35	63	30.6
Gender		
Male	183	88.8
Female	23	11.2
Specialty		
Medical	97	47.1
Surgical	109	52.9
Job title		
Consultant	2	1.0
Senior registrar	85	41.3
Registrar	83	40.3
House officer	36	17.4
Marital status		
Single	93	45.1
Married	113	54.9
Religion		
Christianity	150	72.8
Islam	56	27.2
Ethnicity		
Yoruba	167	81.1
Igbo	35	17.0
Hausa	4	1.9

Table 2 reported the knowledge, attitude and practices towards autopsy. Majority had good knowledge (91.7%), positive attitude (81.1%) and good practices (81.6%). All the participants correctly defined autopsy with specific uses identified as medicolegal (87.9%), cause of death (82.5%) and deaths excepted from autopsy including those occurring in suspected haemorrhagic viral diseases (81.6%) and HIV/HBV (80.1%). Majority were willing to consent for autopsy for self (82.0%) and relative (71.8%). Also, majority believed that doctors should observe autopsy (66.0%) and were willing to counsel family to allow autopsy (64.1%). Majority have ever requested for autopsy in line of practice (81.5%), with challenges faced in autopsy request including delay in obtaining family consent (57.2%), or refusal of family in allowing autopsy due to religious practices (23.0%) and cultural belief (19.8%). Suggested solutions to these challenges include Increasing community awareness about autopsy (90.8%) and waived procedural fees when payment is a problem (58.3%).

Table 2 Autopsy knowledge, attitude and practices.

Variable	Frequency (n = 206)	%
Composite score of autopsy knowledge, attitude and practices		
● Knowledge		
Good	189	91.7
Poor	17	8.3
● Attitude		
Positive	167	81.1
Negative	39	18.9
● Practices		
Good	168	81.6
Poor	38	18.4
1. Knowledge		
Anatomic procedure on the dead (correct)	206	100
1.1. Uses of autopsy		
Medico-legal	181	87.9
Ascertain cause of death	170	82.5
Improve medical diagnosis and practice	133	64.6
Research purpose	122	59.2

Table 2 (Continued) Autopsy knowledge, attitude and practices.

Variable	Frequency (n = 206)	%
1. Knowledge (Continued)		
1.2. Deaths that are excepted from autopsy		
Deaths from suspected haemorrhagic viral diseases	168	81.6
Deaths from HIV/HBV	165	80.1
1.3. Source of information		
Medical book	150	72.8
Lectures/seminars	56	27.2
2. Attitude		
Approved autopsy	180	87.4
Willing to consent for autopsy for relative	148	71.8
Willing to counsel for autopsy for relative	138	67.0
Willing to consent for autopsy for self	169	82.0
All doctors should observe autopsy	136	66.0
Willing to counsel family to allow autopsy	132	64.1
3. Practice		
Ever request for autopsy in line of practice (yes)	168	81.5
3.1. Situations autopsies were performed without permission (n = 168)		
Medico-legal cases	121	72.0
Sudden death	37	22.0
Research purpose	10	6.0
Faced challenges in autopsy request (yes)	152	90.5
3.2. Challenges faced in autopsy request (n = 152)		
Delay in obtaining family consent but autopsy eventually done	87	57.2
Family refusal of autopsy request due to religious belief/practices	35	23.0
Family refusal of autopsy request due to cultural belief	30	19.8

Table 2 (Continued) Autopsy knowledge, attitude and practices.

Variable	Frequency (n = 206)	%
3. Practice (Continued)		
Ever request for autopsy in line of practice (yes)	168	81.5
3.3. Suggested solutions to challenge (n = 152)		
Increase community awareness about autopsy	138	90.8
Waived procedural fees when payment is a problem	89	58.3
Ensure autopsy are done on time	78	51.2
Autopsy should be reported and explained to relative on time	54	35.5
Ever witness autopsy	12	5.8
Ever counselled patient's family on need for autopsy	50	24.3
3.4. Reason for counselling patient's family (n = 50)		
Cause of death not known	25	50.0
Sudden death	22	44.0
Departmental request	3	6.0
3.5. Outcome of counselling (n = 50)		
Positive	13	26
Negative	37	74

Table 3 reported the bivariate analysis of selected variables and autopsy practices among physicians. Significant variables associated with good autopsy practices include age 35 years and above (OR = 3.23, 95% CI = 1.56 – 6.67, $p = 0.002$), Christianity (OR = 4.69, 95% CI = 2.24 – 9.84, $p < 0.001$) and positive attitude (OR = 21.15, 95% CI = 8.91 – 50.25, $p < 0.001$).

Discussions

This study assessed the autopsy knowledge, attitude and practices of physicians working in a teaching hospital. This study finding reported that physicians have good knowledge, positive attitude and good practices towards autopsy. This finding differs from recent studies that reported that autopsy is no longer routinely requested by physicians for several reasons which included fears of litigations from family and other aggrieved parties⁽⁷⁻¹¹⁾. However, this study found that autopsy is rather requested for to avoid litigations, ascertain the definitive cause of death and improve medical diagnosis and practice.

Table 3 Bivariate analysis of selected variables and autopsy practices among the study population.

Variable	Odd ratio (OR)	95% Confidence interval (CI)	p-value
Age group (years)			
25 – 34	1	1.56 – 6.67	0.002
≥ 35	3.23		
Marital status			
Single	1	0.84 – 3.65	0.137
Married	1.75		
Religion			
Islam	1	2.24 – 9.84	< 0.001
Christianity	4.69		
Attitude			
Negative	1	8.91 – 50.25	< 0.001
Positive	21.15		

This study reported that deaths from suspected epidemic prone diseases such as haemorrhagic viral diseases are exempted from autopsy follow international practice to reduce the spread of such diseases to these healthcare workers and their close contacts including other patients and family members⁽²²⁻²⁴⁾.

Also, the study reported that physicians were willing to consent to autopsy for self and relatives. They counsel relatives of dead patients to consent to autopsy so as to improve medical practice. This finding is in contrast with some studies that reported that health workers were averse to autopsy due to litigation fears⁽²³⁻²⁸⁾. This could be because most deaths in some environment are usually taken to be either Gods wish which cannot be changed or has a diabolical cause or due to the witches and wizards hence the risk of litigation is very low⁽²⁵⁻²⁷⁾. However, this spiritual believes and practices of burying the dead immediately by the Islamic faith could be responsible for some physician using religious believe as the basis for not requesting for autopsy or the relatives refusing autopsy^(7,13,25).

Also, majority of the physicians believed that doctors should observe autopsy and were willing to counsel family to allow autopsy. A previous study among physicians in Ibadan reported that only 12.5% were willing to observe autopsy which is quite low when compared to our study finding⁽⁷⁾. This suggests remarkable positive attitude to autopsy improve with provision of more awareness creation activity.

The suggested solutions to challenges face in allowing autopsy include waived procedural fees when payment is a problem. This is related to high poverty level in the study

area where majority earned below the poverty level. Increasing awareness with partial or total reduction in procedural fees could increase acceptance of autopsy by the family members. Also, prompt reporting and giving feedback to family members could increase autopsy uptake by family members.

The factors associated with good autopsy practices include older age, religious belief and having positive attitude to autopsy. The older physicians were more experienced hence were more likely to request and encourage autopsy than younger doctors. Also, the doctors with the Islamic faith when compared to those with Christianity faith tend to resist autopsy because of their religious believes. Previous studies have reported religious objection to be a major hindrance to autopsy^(7-9,13).

This study being questionnaire based cross-sectional obtain information whose content may differ from actual behaviour of our respondents. It will be difficult to generalise the study findings as the study was conducted in a site in southwest Nigeria.

Conclusions

Generally, physicians demonstrate good knowledge, positive attitude and good practices towards autopsy. However, some physicians had poor knowledge, negative attitude and poor practices to autopsy. These physicians should be targeted in trainings on autopsy practices. Hospital should have postmortem management committees to train young physicians on counselling skills and counsel relatives of dead patients. Refresher courses on autopsy targeting the consultants will improve training of residents on counselling for the postmortem. The government should also put policies in place that enforces the postmortem examinations especially when the cause of death is unknown especially for coroners' autopsies. Government may also give waivers or subsidise autopsy fess in order to make more people to consent to the procedure.

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TECHNICAL NOTE

การแบ่งประเภททางโมเลกุลของมะเร็งเต้านม (Molecular classification of breast cancer)

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ปัจจุบันนี้ได้มีการนำวิธีการด้านอณูพยาธิชีววิทยา (Molecular pathobiology) มาประยุกต์ใช้ร่วมกับวิธีอิมมูโนฮิสโตเคมี [Immunohistochemistry (IHC)] เพื่อการประเมินและวิเคราะห์ข้อมูลการแสดงออกของยีนบนพื้นฐานของวิธีแบบไมโครอาร์เรย์ (Microarray-based gene expression profiling) สำหรับการวินิจฉัย การพยากรณ์โรค และการทำนายผลของการตอบสนองต่อการรักษาของมะเร็งเต้านม ซึ่งจากการนำทั้งสองวิธีดังกล่าวมาใช้ศึกษากับเนื้อเยื่อมะเร็งเต้านมจึงเกิดการจำแนกประเภททางโมเลกุล (Molecular subtypes) ของมะเร็งเต้านมได้เป็น 3 กลุ่มหลัก (ตาราง) ดังนี้คือ

กลุ่มที่ 1: Luminal breast cancer แบ่งออกเป็น 2 กลุ่มย่อยคือ

- (1.1). Luminal A breast cancer
- (1.2). Luminal B breast cancer สามารถแบ่งออกได้เป็น 2 ชนิดคือ
 - (1.2.1). Luminal B with Ki67-high breast cancer
 - (1.2.2). Luminal B with less than 20% of PR-positive breast cancer

กลุ่มที่ 2: HER2-positive breast cancer แบ่งออกเป็น 3 กลุ่มย่อยคือ

- (2.1). Luminal HER2 with PR-positive breast cancer
- (2.2). Luminal HER2 with PR-negative breast cancer
- (2.3). HER2-enriched breast cancer

กลุ่มที่ 3: Triple-negative breast cancer แบ่งออกเป็น 2 กลุ่มย่อยคือ

- (3.1). Basal-like breast cancer
- (3.2). Non-classified triple-negative breast cancer

ตารางแสดงการแบ่งประเภททางโมเลกุล (Molecular subtypes) ของมะเร็งเต้านมตามผลการแสดงออกทาง IHC ของโปรตีน ER, PR, HER2, Ki67, CK5 และ EGFR ในเนื้อเยื่อมะเร็งเต้านม

Molecular subtypes of breast cancer		Immunohistochemical expression					
		ER	PR	HER2	Ki67	CK5	EGFR
Luminal	A	Positive	Positive	Negative	Positive < 14% (Low)		
	B, Ki67-high	Positive	Positive ≥ 20%	Negative	Positive ≥ 14% (High)		
	B, PR ⁺ ve < 20%	Positive	Positive < 20%	Negative	Any		
HER2-positive	Luminal HER2, PR ⁺ ve	Positive	Positive	Positive	Any		
	Luminal HER2, PR ⁻ ve	Positive	Negative	Positive	Any		
	HER2-enriched	Negative	Negative	Positive	Any		
Triple-negative	Basal-like	Negative	Negative	Negative	Any	Positive	Positive
	Non-classified	Negative	Negative	Negative	Any	Negative	Negative

เอกสารอ้างอิง

Tang P, Tse GM. Immunohistochemical Surrogates for Molecular Classification of Breast Carcinoma: A 2015 Update. Arch Pathol Lab Med 2016 Aug;140(8):806-814.

APPENDIX 1

INFORMATION FOR AUTHORS

All authors listed in a paper submitted to Asian Archives of Pathology (AAP) must have contributed substantially to the work. It is the corresponding author who takes responsibility for obtaining permission from all co-authors for the submission. When submitting the paper, the corresponding author is encouraged to indicate the specific contributions of all authors (the author statement, with signatures from all authors and percentage of each contribution can be accepted). Examples of contributions include: designed research, performed research, contributed vital new reagents or analytical tools, analysed data, and wrote the paper. An author may list more than one type of contribution, and more than one author may have contributed to the same aspect of the work.

Authors should take care to exclude overlap and duplication in papers dealing with related materials. See also paragraph on Redundant or Duplicate Publication in “Uniform Requirements for Manuscripts Submitted to Biomedical Journals” at <http://www.icmje.org/index.html>.

The submitted manuscripts will be reviewed by the members of the Editorial Board or the expert reviewers. At the discretion of the Editorial Board, the manuscripts may be returned immediately without full review, if deemed not competitive or outside the realm of interests of the majority of the readership of the Journal. The decision (reject, invite revision, and accept) letter will be coming from the Editorial Board who has assumed responsibility for the manuscript’s review. The editor’s decision is based not just on technical merit of the work, but also on other factors such as the priority for publication and the relevance to the Journal’s general readership. All papers are judged in relation to other submissions currently under consideration.

Categories of Manuscripts

1. Letters to the Editor

The letters to the editor are the reactions to any papers published in AAP. These letters will be reviewed by the Editorial Board and sent to the authors of the original paper with an invitation to respond. Letters and eventual responses will be published together, when appropriate.

- *Word Count: 300 – 500 words (excluding references and figure or table legends)*
- *Abstract: Not required*
- *References: Maximum of 10*
- *Figure or Table: Maximum of 1 (if needed)*

2. Original Articles

The original articles are the researches describing the novel understanding of anatomical pathology, clinical pathology (laboratory medicine), forensic medicine (legal medicine or medical jurisprudence), molecular medicine or pathobiology. Systematic reviews, meta-analyses and clinical trials are classified as articles. The articles should be clearly and concisely written in the well-organised form (see ***Organisation of Manuscripts***): abstract; introduction; materials and methods; results; discussion; and conclusions. The manuscripts that have passed an initial screening by the Editorial Board will be reviewed by two or more experts in the field.

- *Word Count: 3,000 – 5,000 words (excluding abstract, references, and figure or table legends)*
- *Structured Abstract (see ***Organisation of Manuscripts***): 150 – 200 words*
- *References: Maximum of 150*
- *Figures or Tables: Maximum of 6*

3. Review Articles

The review articles are generally invited by the Editor-in-Chief. They should focus on a topic of broad scientific interest and on recent advances. These articles are peer-reviewed before the final decision to accept or reject the manuscript for publication. Therefore, revisions may be required.

- *Word Count: 3,000 – 5,000 words (excluding abstract, references, and figure or table legends)*
- *Unstructured Abstract: 150 – 200 words*
- *References: Maximum of 150*
- *Figures or Tables: Maximum of 4*

4. Case Reports

AAP limits publication of case reports to those that are truly novel, unexpected or unusual, provide new information about anatomical pathology, clinical pathology (laboratory medicine) or forensic medicine (legal medicine or medical jurisprudence). In addition, they must have educational value for the aforementioned fields. The journal will not consider case reports describing preventive or therapeutic interventions, as these generally require stronger evidence. Case reports that involve a substantial literature review should be submitted as a review article. The submitted case reports will undergo the usual peer-reviewed process.

- *Word Count: 1,200 – 2,000 words (excluding abstract, references, and figure or table legends)*
- *Unstructured Abstract: 150 – 200 words*
- *References: Maximum of 20*
- *Figures or Tables: Maximum of 4*

5. Case Illustrations

Case illustrations are aimed to provide education to readers through multidisciplinary clinicopathological discussions of interesting cases. The manuscript consists of a clinical presentation or description, laboratory investigations, discussion, final diagnosis, and up to 5 take-home messages (learning points). Regarding continuous learning through self-assessment, each of the case illustrations will contain 3 – 5 multiple choice questions (MCQs) with 4 – 5 suggested answers for each question. These MCQs are placed after the final diagnosis and the correct answers should be revealed after the references. The questions and take-home messages (learning points) are included in the total word count. The manuscripts that have passed an initial screening by the Editorial Board will be reviewed by two experts in the field.

- *Word Count: 1,000 – 2,000 words (excluding references and figure or table legends)*
- *Abstract: Not required*
- *References: Maximum of 10*
- *Figures: Maximum of 2*
- *Tables: Maximum of 5*

6. Technical Notes

The technical notes are brief descriptions of scientific techniques used in the anatomical pathology, clinical pathology (laboratory medicine), forensic medicine (legal medicine or medical jurisprudence), molecular medicine or pathobiology. The submitted manuscripts are usually peer-reviewed.

- *Word Count: Maximum of 1,000 words (excluding references and figure or table legends)*
- *Abstract: Not required*
- *References: Maximum of 5*
- *Figures or Tables: Maximum of 2*

Organisation of Manuscripts

1. General Format

The manuscripts written in English language are preferable. However, Thai papers are also acceptable, but their title pages, abstracts, and keywords must contain both Thai and English. These English and Thai manuscripts are prepared in A4-sized Microsoft Word documents with leaving 2.54-cm (1-inch) margins on all sides. All documents are required to be aligned left and double-spaced throughout the entire manuscript. The text should be typed in 12-point regular Times New Roman font for English manuscript and 16-point regular TH SarabunPSK font for Thai manuscript.

The running titles of English and Thai manuscripts are placed in the top left-hand corner of each page. They cannot exceed 50 characters, including spaces between words and punctuation. For the header of English paper, the running title will be typed in all capital letters. The page number goes on the top right-hand corner.

Footnotes are not used in the manuscripts, but parenthetical statements within text are applied instead and sparingly. Abbreviations should be defined at first mention and thereafter used consistently throughout the article. The standard abbreviations for units of measure must be used in conjunction with numbers.

All studies that involve human subjects should not mention subjects' identifying information (e.g. initials) unless the information is essential for scientific purposes and the patients (or parents or guardians) give written informed consent for publication.

2. Title Page

The title page is the first page of the manuscripts and must contain the following:

- The title of the paper (not more than 150 characters, including spaces between words)
- The full names, institutional addresses, and email addresses for all authors (If authors regard it as essential to indicate that two or more co-authors are equal in status, they may be identified by an asterisk symbol with the caption "These authors contributed equally to this work" immediately under the address list.)
- The name, surname, full postal address, telephone number, facsimile number, and email address of the corresponding author who will take primary responsibility for communication with AAP.
- Conflict of interest statement (If there are no conflicts of interest for any author, the following statement should be inserted: "The authors declare that they have no conflicts of interest with the contents of this article.")

3. Abstract

A structured form of abstract is used in all Original Article manuscripts and must include the following separate sections:

- *Background: The main context of the study*
- *Objective: The main purpose of the study*
- *Materials and Methods: How the study was performed*
- *Results: The main findings*
- *Conclusions: Brief summary and potential implications*
- *Keywords: 3 – 5 words or phrases (listed in alphabetical order) representing the main content of the article*

4. Introduction

The Introduction section should clearly explain the background to the study, its aims, a summary of the existing literature and why this study was necessary or its contribution to the field.

5. Materials and Methods

The Materials and Methods section must be described in sufficient detail to allow the experiments or data collection to be reproduced by others. Common routine methods that have been published in detail elsewhere should not be described in detail. They need only be described in outline with an appropriate reference to a full description. Authors should provide the names of the manufacturers and their locations for any specifically named medical equipment and instruments, and all chemicals and drugs should be identified by their systematic and pharmaceutical names, and by their trivial and trade names if relevant, respectively. Calculations and the statistical methods employed must be described in this section.

All studies involving animal or human subjects must abide by the rules of the appropriate Internal Review Board and the tenets of the recently revised Helsinki protocol. Hence, the manuscripts must include the name of the ethics committee that approved the study and the committee's reference number if appropriate.

6. Results

The Results section should concisely describe the findings of the study including, if appropriate, results of statistical analysis which must be presented either in the text or as tables and figures. It should follow a logical sequence. However, the description of results should not simply repeat the data that appear in tables and figures and, likewise, the same data should not be displayed in both tables and figures. Any chemical equations, structural

formulas or mathematical equations should be placed between successive lines of text. The authors do not discuss the results or draw any conclusions in this section.

7. Discussion

The Discussion section should focus on the interpretation and the significance of the findings against the background of existing knowledge. The discussion should not repeat information in the results. The authors will clearly identify any aspects that are novel. In addition, there is the relation between the results and other work in the area.

8. Conclusions

The Conclusions section should state clearly the main summaries and provide an explanation of the importance and relevance of the study reported. The author will also describe some indication of the direction future research should take.

9. Acknowledgements

The Acknowledgements section should be any brief notes of thanks to the following:

- *Funding sources*
- *A person who provided purely technical help or writing assistance*
- *A department chair who provided only general support*
- *Sources of material (e.g. novel drugs) not available commercially*

Thanks to anonymous reviewers are not allowed. If you do not have anyone to acknowledge, please write “Not applicable” in this section.

10. References

The Vancouver system of referencing should be used in the manuscripts. References should be cited numerically in the order they appear in the text. The authors should identify references in text, tables, and legends by Arabic numerals in parentheses or as superscripts. Please give names of all authors and editors. The references should be numbered and listed in order of appearance in the text. The names of all authors are cited when there are six or fewer. When there are seven or more, only the first three followed by “et al.” should be given. The names of journals should be abbreviated in the style used in Index Medicus (see examples below). Reference to unpublished data and personal communications should not appear in the list but should be cited in the text only (e.g. A Smith, unpubl. Data, 2000).

- *Journal article*

1. Sibai BM. Magnesium sulfate is the ideal anticonvulsant in preeclampsia – eclampsia. Am J Obstet Gynecol 1990; 162: 1141 – 5.

- *Books*
 2. Remington JS, Swartz MN. Current Topics in Infectious Diseases, Vol 21. Boston: Blackwell Science Publication, 2001.
- *Chapter in a book*
 3. Cunningham FG, Hauth JC, Leveno KJ, Gilstrap L III, Bloom SL, Wenstrom KD. Hypertensive disorders in pregnancy. In: Cunningham FG, Hauth JC, Leveno KJ, Gilstrap L III, Brom SL, Wenstrom KD, eds. Williams Obstetrics, 22nd ed. New York: McGraw-Hill, 2005: 761 – 808.

11. Tables

The tables should be self-contained and complement, but without duplication, information contained in the text. They should be numbered consecutively in Arabic numerals (Table 1, Table 2, etc.). Each table should be presented on a separate page with a comprehensive but concise legend above the table. The tables should be double-spaced and vertical lines should not be used to separate the columns. The column headings should be brief, with units of measurement in parentheses. All abbreviations should be defined in footnotes. The tables and their legends and footnotes should be understandable without reference to the text. The authors should ensure that the data in the tables are consistent with those cited in the relevant places in the text, totals add up correctly, and percentages have been calculated correctly.

12. Figure Legends

The legends should be self-explanatory and typed on a separate page titled “Figure Legends”. They should incorporate definitions of any symbols used and all abbreviations and units of measurement should be explained so that the figures and their legends are understandable without reference to the text.

If the tables or figures have been published before, the authors must obtain written permission to reproduce the materials in both print and electronic formats from the copyright owner and submit them with the manuscripts. These also follow for quotes, illustrations, and other materials taken from previously published works not in the public domain. The original resources should be cited in the figure captions or table footnotes.

13. Figures

All illustrations (line drawings and photographs) are classified as figures. The figures should be numbered consecutively in Arabic numerals (Figure 1, Figure 2, etc.). They are submitted electronically along with the manuscripts. These figures should be referred to specifically in the text of the papers but should not be embedded within the text. The following information must be stated to each microscopic image: staining method,

magnification (especially for electron micrograph), and numerical aperture of the objective lens. The authors are encouraged to use digital images (at least 300 d.p.i.) in .jpg or .tif formats. The use of three-dimensional histograms is strongly discouraged when the addition of these histograms gives no extra information.

14. Components

14.1. Letters to the Editor

The Letter to the Editor manuscripts consist of the following order:

- *Title Page*
- *Main Text*
- *References*
- *Table (if needed)*
- *Figure Legend (if needed)*
- *Figure (if needed)*

14.2. Original Articles

The Original Article manuscripts consist of the following order:

- *Title Page*
- *Structured Abstract*
- *Introduction*
- *Materials and Methods*
- *Results*
- *Discussion*
- *Conclusions*
- *Acknowledgements*
- *References*
- *Table (s)*
- *Figure Legend (s)*
- *Figure (s)*

14.3. Review Articles

The Review Article manuscripts consist of the following order:

- *Title Page*
- *Unstructured Abstract*
- *Introduction*
- *Main Text*
- *Conclusions*
- *Acknowledgements*
- *References*
- *Table (s)*

- *Figure Legend (s)*
- *Figure (s)*

14.4. Case Reports

The Case Report manuscripts consist of the following order:

- *Title Page*
- *Unstructured Abstract*
- *Introduction*
- *Case Description*
- *Discussion*
- *Conclusions*
- *Acknowledgements*
- *References*
- *Table (s)*
- *Figure Legend (s)*
- *Figure (s)*

14.5. Case Illustrations

The Case Illustration manuscripts consist of the following order:

- *Title Page*
- *Clinical Presentation or Description*
- *Laboratory Investigations*
- *Discussion*
- *Final Diagnosis*
- *Multiple Choice Questions (MCQs)*
- *Take-Home Messages (Learning Points)*
- *Acknowledgements*
- *References*
- *Correct Answers to MCQs*
- *Table (s)*
- *Figure Legend (s)*
- *Figure (s)*

14.6. Technical Notes

The Technical Note manuscripts consist of the following order:

- *Title Page*
- *Introduction*
- *Main text*
- *Conclusions*
- *Acknowledgements*
- *References*

- *Table (s)*
- *Figure Legend (s)*
- *Figure (s)*

Proofreading

The authors of the accepted manuscripts will receive proofs and are responsible for proofreading and checking the entire article, including tables, figures, and references. These authors should correct only typesetting errors at this stage and may be charged for extensive alterations. Page proofs must be returned within 48 hours to avoid delays in publication.

Revised Manuscripts

In many cases, the authors will be invited to make revisions to their manuscripts. The revised manuscripts must generally be received by the Editorial Board within 3 months of the date on the decision letter or they will be considered a new submission. An extension can sometimes be negotiated with the Editorial Board.

APPENDIX 2

BENEFITS OF PUBLISHING WITH ASIAN ARCHIVES OF PATHOLOGY

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