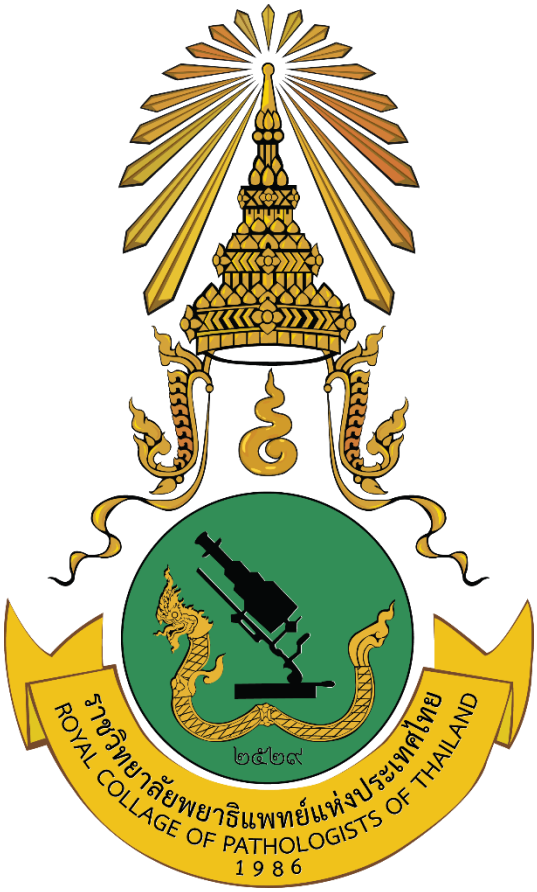
ASIAN ARCHIVES OF PATHOLOGY

THE OFFICIAL JOURNAL OF THE ROYAL COLLEGE OF PATHOLOGISTS OF THAILAND



Volume 1
Number 4
October – December 2019

Print ISSN: 1905-9183

Online ISSN: 2673-0499

EDITORIAL BOARD

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 "วารสารราชวิทยาลัยพยาธิแพทย์แห่งประเทศไทย" 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

The Royal College of Pathologists of Thailand and Editorial Board cannot be held responsible for errors or any consequences arising from the use of information contained in Asian Archives of Pathology. It should also be noted that the views and opinions expressed in this journal do not necessarily reflect those of The Royal College of Pathologists of Thailand and Editorial Board.

MANUSCRIPT REVIEWERS

CONTENTS

About the journal ..... **i**

Aims and scope i

Publication frequency ii

Disclaimer ii

Manuscript reviewers ..... **iii**

Letter to the Editor **1**

- **The expression of *EN1* gene in cancer cells** **1**

  Pasra Arnutti

Case Report **3**

- **Increased cardiac troponin T concentrations in a young obese man with chest pain and non-obstructive coronary arteries** **3**

  Pusadee Luenee, Noppadol Arechep, Sudcharee Kiartivich, Sudarat Piyophirapong, Nattawut Wongpraparut and Kosit Sribhen

Technical Note **10**

- **Nottingham prognostic index (NPI)** **10**

  Supakorn Piyaisrakul

Appendix 1: Information for authors **13**

Categories of manuscripts 14

Organisation of manuscripts 16

Proofreading 24

Revised manuscripts 24

Appendix 2: Benefits of publishing with Asian Archives of Pathology **25**

Appendix 3: Submission of the manuscripts **26**

Appendix 4: Contact the journal **27**

Appendix 5: Support the journal **28**

LETTER TO THE EDITOR

การแสดงออกของยีน *EN1* ในเซลล์มะเร็ง

(The expression of *EN1* gene in cancer cells)

ภัสรา อาณัติ

ภาควิชาพยาธิวิทยา ชั้น 6 อาคารเจ้าฟ้าเพชรรัตน วิทยาลัยแพทยศาสตร์พระมงกุฎเกล้า
เลขที่ 317 ถนนราชวิถี แขวงทุ่งพญาไท เขตราชเทวี จังหวัดกรุงเทพมหานคร รหัสไปรษณีย์ 10400
โทรศัพท์: +66 (0) 83 619 8689 โทรสาร: +66 (0) 2 354 7791
Email: pasra@pcm.ac.th, pasra@pcmpathology.org, pasra@hotmail.com

ยีน *Engrailed homeobox 1* (*EN1*) ตั้งอยู่บนโครโมโซมคู่ที่ 2 ตรงตำแหน่งที่ 14.2 ของแขนยาว (q arm) (2q14.2) มีหน้าที่ควบคุมการสร้างโปรตีนที่เกี่ยวข้องกับการเจริญเติบโตของเซลล์ในระบบประสาทส่วนกลาง [Central nervous system (CNS)][1-4] อย่างไรก็ตามมีรายงานเกี่ยวกับความสัมพันธ์ระหว่างยีน *EN1* กับมะเร็งชนิดต่าง ๆ ดังนี้คือ ร้อยละ 73 (66 รายจากจำนวน 90 ราย) ของมะเร็งลำไส้ใหญ่ (Colorectal carcinoma) จะพบ Deoxyribonucleic acid (DNA) methylation ของยีน *EN1*[5] ประมาณร้อยละ 61.58 (109 รายจากจำนวน 177 ราย) ของเนื้อเยื่อมะเร็งต่อมน้ำลายชนิด Adenoid cystic carcinoma พบการแสดงออกของโปรตีน EN1 เพิ่มขึ้นเมื่อตรวจด้วยวิธีอิมมูโนฮีสโตเคมี [Immunohistochemistry (IHC)] ซึ่งผู้ป่วยมะเร็งต่อมน้ำลายชนิดนี้ที่มีการแสดงออกทาง IHC ของโปรตีน EN1 เพิ่มขึ้นนั้น จะมีอัตราการรอดชีวิตที่ลดลง (Poor survival rate) และอุบัติการณ์การแพร่กระจายของเซลล์มะเร็งไปที่ต่อมน้ำเหลือง (Lymph node metastasis) สูงขึ้นอย่างมีนัยสำคัญ[6] จากการศึกษากับเซลล์มะเร็งเต้านมชนิด Basal-like ที่ทำการเพาะเลี้ยงไว้ (Basal-like breast cancer cell line) พบว่า เมื่อยีน *EN1* มีการแสดงออกที่เพิ่มขึ้นในเซลล์มะเร็งเต้านมที่เพาะเลี้ยง จะส่งผลให้เซลล์มะเร็งดังกล่าวมีการรอดชีวิตที่สูงขึ้นและยังสามารถต้านทานยาเคมีบำบัดได้มากขึ้นอีกด้วย[7]

ในปี พ.ศ. 2556 (ค.ศ. 2013) ภัสราและคณะได้ทำการตรวจหาแบบแผนการแสดงออกของยีนที่เกี่ยวข้องกับความรุนแรงของโรคในเนื้อเยื่อมะเร็งเต้านมปฐมภูมิชนิดคาร์ซิโนมาแบบรุกราน [Primary infiltrating (invasive) breast carcinoma (1° IBC)] ของสตรีไทย โดยใช้วิธีไมโครอาร์เรย์ (Microarray) ชนิด Affymetrix GeneChip® Exon 1.0 Sense Target Arrays ทำการเปรียบเทียบระหว่างเซลล์เยื่อบุผิวของต่อมน้ำนมปกติ (Normal mammary epithelial cells) และเซลล์มะเร็งเต้านม (Breast cancer cells) พบว่าเซลล์มะเร็งเต้านมมีการเปลี่ยนแปลงในการทำงานของยีนจำนวน 928 ยีน อีกทั้งได้ตรวจพบว่าร้อยละ

26.32 (5 รายจากจำนวน 19 ราย) ของเนื้อเยื่อมะเร็งเต้านมชนิด 1° IBC จะมีการทำงานของยีน *EN1* เพิ่มมากขึ้นอย่างมีนัยสำคัญ[8]

<u>เอกสารอ้างอิง</u>

(1). EN1 engrailed homeobox 1 [*Homo sapiens* (human)] . 2016; Available at: https://www.ncbi.nlm.nih.gov/gene/2019. Accessed November 2016, 2016.

(2). Alves dos Santos MT, Smidt MP. En1 and Wnt signaling in midbrain dopaminergic neuronal development. Neural Dev 2011 May 10;6:23-8104-6-23.

(3). Kohler A, Logan C, Joyner AL, Muenke M. Regional assignment of the human homeobox-containing gene EN1 to chromosome 2q13-q21. Genomics 1993 Jan;15(1):233-235.

(4). Sgaier SK, Lao Z, Villanueva MP, Berenshteyn F, Stephen D, Turnbull RK, et al. Genetic subdivision of the tectum and cerebellum into functionally related regions based on differential sensitivity to engrailed proteins. Development 2007 Jun;134(12):2325-2335.

(5). Mayor R, Casadome L, Azuara D, Moreno V, Clark SJ, Capella G, et al. Long-range epigenetic silencing at 2q14.2 affects most human colorectal cancers and may have application as a non-invasive biomarker of disease. Br J Cancer 2009 May 19;100(10):1534-1539.

(6). Bell D, Bell A, Roberts D, Weber RS, El-Naggar AK. Developmental transcription factor EN1--a novel biomarker in human salivary gland adenoid cystic carcinoma. Cancer 2012 Mar 1;118(5):1288-1292.

(7). Beltran AS, Graves LM, Blancafort P. Novel role of Engrailed 1 as a prosurvival transcription factor in basal- like breast cancer and engineering of interference peptides block its oncogenic function. Oncogene 2014 Sep 25;33(39):4767-4777.

(8). Arnutti P. Determination of genes expression profile of breast cancer in Thai patients using Affymetrix Gene Chip. 2012. (PhD thesis)

CASE REPORT

Increased cardiac troponin T concentrations in a young obese man with chest pain and non-obstructive coronary arteries

Pusadee Luenee[1], Noppadol Arechep[1], Sudcharee Kiartivich[1], Sudarat Piyophirapong[1], Nattawut Wongpraparut[2] and Kosit Sribhen[1*]

[1] *Department of Clinical Pathology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*

[2] *Department of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*

* Correspondence to: Dr Kosit Sribhen, Department of Clinical Pathology, Floor 10, Adulyadejvikrom Building, Faculty of Medicine Siriraj Hospital, Mahidol University, 2 Wanglang Road, Bangkoknoi, Bangkok, 10700 Thailand. Telephone: +66 (0) 2 419 6587 – 9 Fax: +66 (0) 2 418 1367 Email: chos_kos@hotmail.com

Conflict of interest: The authors declare that they have no conflicts of interest with the contents of this article.

Abstract

Acute myocardial infarction in young patients with non-obstructive coronary arteries is rare and has been rarely reported in the literature. We report herein a case of an obese young man presented to the emergency department with typical chest pain, ischaemic ECG changes, and elevated cardiac troponin T concentrations, in whom coronary angiogram revealed nearly normal coronary arteries. The cause of increased troponin in this patient is not known but may involve microvascular spasm, possibly mediated through endothelial dysfunction frequently encountered in obese patients. Since these patients have been reported to be at high risk of future coronary events, the treatment of obesity and its associated coronary artery disease risk factors should be intensified and an adoption of a healthy lifestyle should be initiated as early as possible.

Keywords: cardiac troponin T; myocardial infarction; non-obstructive coronary arteries

Introduction

In the past decades, measurements of cardiac troponin concentration have been proved to be reliable methods for diagnosis of acute myocardial infarction (AMI) and for prognostication in acute coronary syndrome (ACS) patients. The introduction of sophisticated immunoassays in recent years has led to troponin testings with improved analytical performances that fulfill the guidelines recommended by the international cardiology societies[(1)]. According to these guidelines, the diagnosis of an AMI can be made by the presence of elevated cardiac troponins and typical symptoms or electrocardiographic changes consistent with myocardial ischaemia in patients with (type 1 AMI) and without obstructive coronary artery (type 2 AMI), as well as in those underwent percutaneous (type 4 AMI) or surgical revascularization procedures (type 5 AMI). In this context, it should be noted that although AMI may represent a frequent cause of increased cardiac troponins, this can be seen in several other conditions in chest pain patients including myopericarditis, pulmonary embolism, aortic dissection and stress cardiomyopathy. Thus, cardiac troponins are specific markers of myocardial cell damage but are non-specific with respect to the aetiologies of their elevations[(2)].

The present study reports a case of a young male patient with obesity presenting with typical chest pain and elevated cardiac troponin T (cTnT), in whom cardiac catheterization has revealed a non-obstructive coronary angiogram. The possible causes and mechanisms of increased cardiac biomarkers in this patient will also be described and discussed.

Case Report

A 48-year-old man came to the emergency department with a complaint of retrosternal chest pain of around 5 minutes of duration which occurred during walking. The chest discomfort was accompanied by diaphoresis and dizziness, but he denied any shortness of breath, nausea or vomiting. Similar symptoms have repeatedly occurred in the past 2 days. There was no family history of coronary heart disease but a history of taking lipid-lowering and antihypertensive medications in the past 6 months. His body mass index (BMI) and waist circumference, determined prior to the medical treatment, were 31.49 and 100 cm, respectively. At this time point, his blood pressure was slightly elevated at 147/86 mmHg.

The electrocardiogram showed sinus rhythm, with a heart rate of 93 beat per minute, as well as abnormal Q wave in the leads II, III and aVR, and flattened T wave in the anterolateral leads. The echocardiographic assessment has revealed no wall motion

abnormality, with left ventricular ejection fraction of 72%. Cardiac troponin T, determined with a high-sensitivity assay (Roche Diagnostics) on the Cobas 602 analyzer, was 501 ng/L (99th percentile reference limit of 14 ng/L). Based on these results and in accordance with the 2015 ESC guidelines[3], it was decided to proceed to invasive procedure with cardiac catheterization which has revealed a non-obstructive coronary angiogram (*Figure*). Accordingly, a diagnosis of myocardial infarction with non-obstructive coronary arteries (MINOCA) was made. Troponin measurements on the next days (*Table*) have shown a falling pattern, thus confirming the diagnosis of an AMI. Determination of N-terminal probrain natriuretic peptide (NT-proBNP) (Roche Diagnostics) has shown an increased concentration of 1451 ng/L (cut-off level for the age of < 50 years is 450 ng/L). D-dimer (BioMerieux SA) level was 293 ug/L (normal < 500 µg/L).

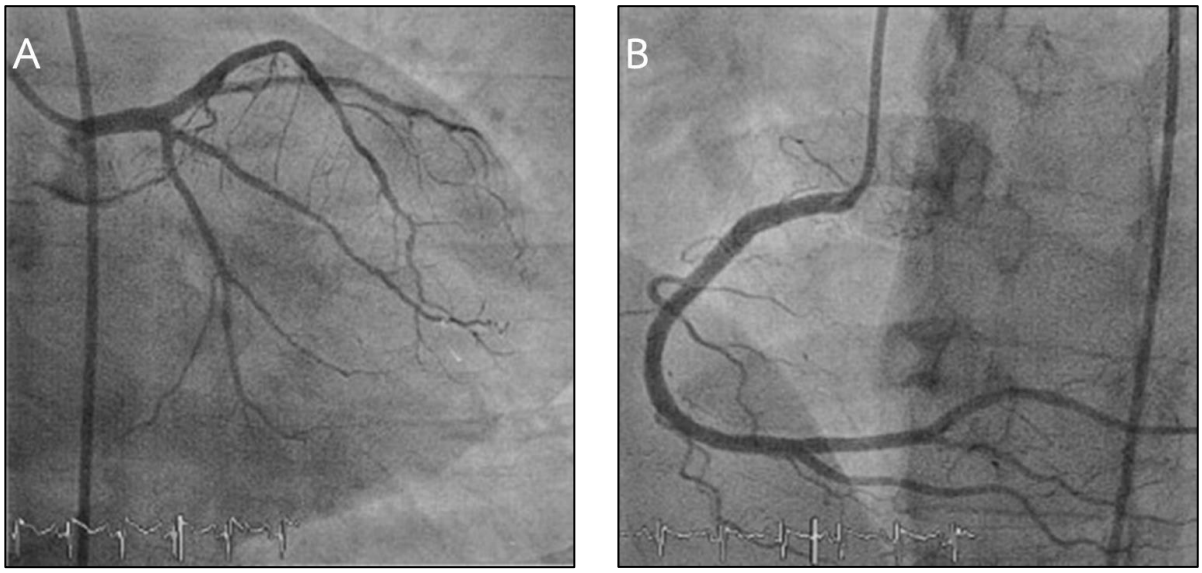


Figure: Coronary angiograms of the left (A) and right coronary arteries (B).

Table: Cardiac biomarker levels serially determined during a period of 2 weeks.

	Day 1	Day 3	Day 14
Cardiac troponin T (ng/L)	501	215	11.43
NT-proBNP (ng/L)	nd	1,451	164
D-dimer (µg/L)	nd	293	nd

Note: *nd = Not determined*

The treatment with lipid-lowering and anti-hypertensive medications was continued and intensified, and aspirin was added. He was recommended to adopting a healthy lifestyle, which consists mainly of a healthy diet and regular physical activity. Six months after discharge from the hospital, the patient has achieved a significant weight reduction and was free of any cardiac symptoms.

Discussions

AMI in young people, defined as the age of less than 45 years, is not uncommon and has been reported to occur in 6.8% of all AMI cases registered in a Spanish epidemiological study[4]. In a study by Gupta et al., AMI hospitalisation rates, determined between 2001 and 2010, did not decline for young women and men aged 30 to 54 years which were in contrast to those obtained from older people. The absolute number of discharges for AMI among women even increased, thus indicating the importance of considering AMI with non-obstructive coronary arteries in the young patient group[5].

The young AMI patients have been reported to have a rising trend in the prevalence of cardiovascular risk factors, especially hypertension and diabetes mellitus[5]. However, it has been shown that AMI patients with normal coronary arteries exhibited a lower BMI, a similar systolic blood pressure and a favourable lipid profile as compared to the patients with coronary heart disease (CHD)[6]. Since our patients has received lipid-lowering and anti-hypertensive medications for a long time, it is not possible to determine the prior extent and severity of these risk factors. Nevertheless, he had a BMI of > 30 and a history of sedentary lifestyle which currently are accepted as important CHD risk factors.

At present, measurements of cardiac troponins have become the preferred biochemical methods for the diagnosis of AMI, thereby replacing CK-MB measurements. The advent of high-sensitivity immunoassays with improved analytical sensitivity has allowed for increased clinical sensitivity for the early detection of myocardial infarction. This was, however, associated with reduced clinical specificity[2]. In the case of our patient, several causes of increased cardiac troponins in chest pain patients with non-obstructive coronary arteries are to be considered. The first is viral myopericarditis, especially those that occur in young persons. However, although laboratory investigations of viral infection were not performed in our patient, he was free of recent febrile illness and the ECG findings of the presence of Q waves and flattened T waves are not typical of the disease which usually shows a widespread ST-T segment elevation[7]. Pulmonary embolism as another possible cause of elevated cardiac troponin can

be ruled out by the absence of risk factor such as the deep venous thrombosis and a negative D-dimer test[8]. Stress (takotsubo) cardiomyopathy is a recently described acute chest pain syndrome that is associated with release of cardiac troponin in a rising and falling pattern, ischaemic ECG changes, and a non-obstructive coronary angiogram. Nonetheless, this syndrome can also be ruled out by the absence of a history of physical or emotional stress, male sex, and by the absence of apical and midventricular akinesia and preserved contraction of the basal segment on echocardiogram[9]. Other causes of MINOCA include coronary artery anomalies or dissection[10].

In our opinion, the most likely cause of increased troponin T in our patient can either be the epicardial coronary artery spasm or coronary microvascular constriction or spam. The former, however, is not likely the cause since it is usually associated with angina at rest and a transient ST segment elevation on the ECG[11-12]. Coronary microvascular spasm, on the other hand, is characterised by ST-segment changes during spontaneous or provoked angina, in the presence of normal or slightly diseased coronary arteries. The condition has been described to occur in about 25% of patients with chest pain and non-obstructive coronary artery disease (NOCAD)[13]. Nevertheless, the limitation of the present study is that we have not performed the acetylcholine test which can reliably and safely be used to distinguish the two entities from each other[14].

The potential pathophysiological mechanisms of the disease mainly include an impairment of endothelium-dependent vasodilatation due to reduced nitric oxide production and release, as well as enhanced vasoconstrictor activity owing to abnormalities in cardiac adrenergic innervation, both of which result in coronary microvascular spasm and reduced microvascular blood flow[13,15]. In this context, it is important to note that in all the clinical conditions mentioned above, cardiac troponins may show a rising and/or falling pattern mimicking an AMI. In addition, the troponin increases in these patients are usually of similar magnitude as compared to those in non-ST-segment elevation myocardial infarction (NSTEMI) and thus, cannot be used to distinguish the one from another. Nevertheless, troponin levels may have some prognostic significance that should be determined in future investigations.

Conclusions

AMI with non-obstructive or normal coronary arteries is not uncommon and can be found in relatively young patients with a relatively high prevalence of cardiovascular risk factors. Since these patients have been shown to be at high risk of subsequent coronary events

during a long-term follow-up[16], they should be followed closely and the search for the cause of troponin elevation should be comprehensive. In addition, the treatment of coronary artery disease (CAD) risk factors should be intensified and adoption of a healthy lifestyle should be initiated as early as possible.

References

(1). Thygesen K, Alpert JS, Jaffe AS, Simoons ML, Chaitman BR, White HD, et al. The Writing Group on Behalf of the Joint ESC/ACCF/AHA/WHF Task Force for the Universal Definition of Myocardial Infarction. Third universal definition of myocardial infarction. Circulation 2012 Oct 16; 126 (16): 2020-35.

(2). Newby LK, Jesse RL, Babb JD, Christenson RH, De Fer TM, Diamond GA, et al. ACCF 2012 expert consensus document on practical clinical considerations in the interpretation of troponin elevations: a report of the American College of Cardiology Foundation Task Force on Clinical Expert Consensus Document. J Am Coll Cardiol 2012 Dec 11; 60(23): 2427-63.

(3). Roffi M, Patrono C, Collet JP, Mueller C, Valgimigli M, Andreotti F, et al. 2015 ESC guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. Task Force for the Management of Acute Coronary Syndromes in Patients Presenting without Persistent ST-segment Elevation of the European Society of Cardiology (ESC). Eur Heart J 2016 Jan 14; 37(3): 267-315.

(4). Morillas PJ, Cabades A, Bertomeu V, Echanove I, Colomina F, Cebrian J, et al. Acute myocardial infarction in patients under 45 years. Rev Esp Cardiol 2002; 55(11): 1124-31.

(5). Gupta A, Wang Y, Spertus JA, Geda M, Lorenze N, Price CN, et al. Trends in acute myocardial infarction in young patients and differences by sex and race, 2001 to 2010. J Am Coll Cardiol 2014 Jul 29; 64(4): 337-45.

(6). Daniel M, Ekenbaeck C, Agewall S, Brolin EB, Caidahl K, Cederlund K, et al. Risk factors and markers for acute myocardial infarction with angiographically normal coronary arteries. Am J Cardiol 2015 Sep 15; 116(6): 838-44.

(7). Imazio M, Spodick DH, Brucato A, Trinchero R, Adler Y. Controversial issues in the management of pericardial diseases. Circulation 2010 Feb 23; 121(7): 916-28.

(8). Giannitsis E, Mair J, Christersson C, Siegbahn A, Huber K, Jaffe AS, et al. How to use D-dimer in acute cardiovascular care. Eur Heart J Acute Cardiovasc Care 2017 Feb; 6(1): 69-80.

(9). Luescher TF, Templin C. Is takotsubo syndrome a microvascular acute coronary syndrome? Towards of a new definition. Eur Heart J 2016 Oct 1; 37(37): 2816-20.

(10). Sathirareuangchai S, Phuangphung P, Poriswanish N. Myocardial infarction without coronary artery atherosclerosis: Pathological aspect. Asian Arch Pathol 2015; 11(3): 71-79.

(11). Niccoli G, Scalone G, Crea F. Acute myocardial infarction with no obstructive coronary atherosclerosis: mechanisms and management. Eur Heart J 2015 Feb 21; 36(8): 475-81.

(12). Lanza GA, Crea F. Acute coronary syndromes without obstructive coronary atherosclerosis. The tiles of a complex puzzle. Circ Cardiovasc Interv 2014 Jun; 7(3): 278-81.

(13). Mohri M, Koyanagi M, Egashira K, Tagawa H, Ichiki T, Shimokawa H, et al. Angina pectoris caused by coronary microvascular spasm. Lancet 1998 Apr 18; 351(9110): 1165-69.

(14). Montone RA, Niccoli G, Fracassi F, Russo M, Gurgoglione F, Camma G, et al. Patients with acute myocardial infarction and non-obstructive coronary arteries: safety and prognostic relevance of invasive coronary provocative tests. Eur Heart J 2018 Jan 7; 39(2): 91-98.

(15). Lanza GA, Crea F. Primary coronary microvascular dysfunction. Clinical presentation, pathophysiology, and management. Circulation 2010 Jun 1; 121(21): 2317-25.

(16). Bugiardini R, Manfrini O, De Ferrari GM. Unanswered questions for management of acute coronary syndrome. Risk stratification of patients with minimal disease or normal findings on coronary angiography. Arch Intern Med 2006 July 10; 166: 1391-95.

TECHNICAL NOTE

ดัชนีการพยากรณ์โรคมะเร็งเต้านมของน็อตติ้งแฮม [Nottingham prognostic index (NPI)]

ศุภกร ปิยะอิศรากุล

กองพยาธิกรรม โรงพยาบาลภูมิพลอดุลยเดช เลขที่ 171 ถนนพหลโยธิน แขวงคลองถนน เขตสายไหม จังหวัดกรุงเทพมหานคร รหัสไปรษณีย์ 10220 โทรศัพท์: +66 (0) 81 932 8188 โทรสาร: +66 (0) 2 534 7258

Email: harajuku_wow@hotmail.com

ในทางศัลยพยาธิวิทยา (Surgical pathology) ได้มีการนำสิ่งที่ตรวจพบจากการตรวจทางพยาธิวิทยาของชิ้นเนื้อมะเร็งเต้านมจำนวน 3 อย่างดังต่อไปนี้คือ (1) ขนาดของก้อนมะเร็ง (Tumour size), (2) ระดับความแตกต่างทางจุลกายวิภาคของเซลล์มะเร็ง (Histological grade) และ (3) จำนวนต่อมน้ำเหลืองบริเวณรักแร้ที่มีเซลล์มะเร็งเต้านมแพร่กระจายมา [Axillary lymph node metastasis (ALNM)] โดยมิได้อาศัยผลของการย้อมตัวบ่งชี้ทางชีวภาพ (Biomarker) จากวิธีอิมมูโนฮีสโตเคมี [Immunohistochemistry (IHC)] ของเซลล์มะเร็งเต้านมแต่อย่างใด มาใช้ในการสร้างเป็นสูตรคณิตศาสตร์แบบง่าย ๆ เพื่อการประเมินอัตราการรอดชีวิตของผู้ป่วยในระยะเวลา 5 ปี (5-year survival rate) ซึ่งเรียกว่า “**ดัชนีการพยากรณ์โรคมะเร็งเต้านมของน็อตติ้งแฮม [Nottingham prognostic index (NPI)]**” ดังนี้คือ **(0.2 x ขนาดสูงสุดของเส้นผ่านศูนย์กลางซึ่งวัดเป็นหน่วยเซนติเมตรของก้อนมะเร็งจากชิ้นเนื้อที่ทำการตรวจทางพยาธิวิทยา) + ระดับความแตกต่างทางจุลกายวิภาคของเซลล์มะเร็ง + ระดับคะแนนที่จำแนกกลุ่มตามจำนวนของ ALNM** โดยระดับความแตกต่างทางจุลกายวิภาคของเซลล์มะเร็งจะแบ่งออกเป็น 1, 2 และ 3 และระดับคะแนนของต่อมน้ำเหลืองบริเวณรักแร้จะประกอบด้วย คะแนนระดับที่ 1 สำหรับกรณีที่ไม่มี ALNM คะแนนระดับที่ 2 สำหรับกรณีที่พบ ALNM จำนวน 1 – 3 ต่อม และคะแนนระดับที่ 3 สำหรับกรณีที่พบ ALNM จำนวนตั้งแต่ 4 ต่อมขึ้นไป[1-8]

สำหรับลักษณะของความสัมพันธ์ระหว่างค่า NPI กับผลของการพยากรณ์โรค[3] และการคาดคะเนอัตราการรอดชีวิตในระยะเวลา 5 ปี[9] ของผู้ป่วยมะเร็งเต้านมนั้นจะถูกแสดงดังตาราง อย่างไรก็ตามค่า NPI จะไม่ถูกนำมาใช้ประกอบการพยากรณ์โรคหากผู้ป่วยมะเร็งเต้านมได้รับการรักษาด้วยยาเคมีบำบัดและ/หรือการฉายรังสีก่อนก่อนผ่าตัด (Neoadjuvant therapy) หรือมีการรุกรานของมะเร็งสู่เนื้อเยื่อที่อยู่ข้างเคียง หรือมี

การกระจายของเซลล์มะเร็งไปที่อวัยวะต่าง ๆ ของร่างกาย (Cancer metastasis) หรือมะเร็งกลับมาเป็นซ้ำอีกครั้ง (Recurrent cancer)[3]

ตารางแสดงความสัมพันธ์ระหว่างดัชนีการพยากรณ์โรคมะเร็งเต้านมของน็อตติ้งแฮม [Nottingham prognostic index (NPI)] กับผลของการพยากรณ์โรค (Prognosis)[3] และการทำนายอัตราการรอดชีวิตในระยะเวลา 5 ปี [Predicted 5-year survival rate (5-YSR)][9] สำหรับผู้ป่วย

NPI[3]	Prognosis[3]	Predicted 5-YSR[9]
≤ 2.39	ดีเลิศ (Excellent)	93%
2.40 – 3.39	ดี (Good)	85%
3.40 – 4.39	ปานกลางประเภทที่ 1 (Moderate 1)	70%
4.40 – 5.39	ปานกลางประเภทที่ 2 (Moderate 2)	70%
5.40 – 6.39	ไม่ดี (Poor)	50%
≥ 6.40	แย่มาก (Very poor)	50%

<u>เอกสารอ้างอิง</u>

(1). Blamey RW. Estimation of prognosis of the individual with primary breast cancer and its applications. Scand J Surg 2002;91(3):273-278.

(2). Blamey RW, Ellis IO, Pinder SE, Lee AH, Macmillan RD, Morgan DA, et al. Survival of invasive breast cancer according to the Nottingham Prognostic Index in cases diagnosed in 1990-1999. Eur J Cancer 2007 Jul;43(10):1548-1555.

(3). Ellis IO, Carder P, Hales S, Lee AHS, Pinder SE, Rakha E, et al. Pathology reporting of breast disease in surgical excision specimens incorporating the dataset for histological reporting of breast cancer. 2016:160.

(4). Haybittle JL, Blamey RW, Elston CW, Johnson J, Doyle PJ, Campbell FC, et al. A prognostic index in primary breast cancer. Br J Cancer 1982 Mar;45(3):361-366.

(5). Kollias J, Murphy CA, Elston CW, Ellis IO, Robertson JF, Blamey RW. The prognosis of small primary breast cancers. Eur J Cancer 1999 Jun;35(6):908-912.

(6). Todd JH, Dowle C, Williams MR, Elston CW, Ellis IO, Hinton CP, et al. Confirmation of a prognostic index in primary breast cancer. Br J Cancer 1987 Oct;56(4):489-492.

(7). Van Belle V, Van Calster B, Brouckaert O, Vanden Bempt I, Pintens S, Harvey V, et al. Qualitative assessment of the progesterone receptor and HER2 improves the Nottingham Prognostic Index up to 5 years after breast cancer diagnosis. J Clin Oncol 2010 Sep 20;28(27):4129-4134.

(8). Williams C, Brunskill S, Altman D, Briggs A, Campbell H, Clarke M, et al. Cost-effectiveness of using prognostic information to select women with breast cancer for adjuvant systemic therapy. Health Technol Assess 2006 Sep;10(34):iii-iv, ix-xi, 1-204.

(9). Hamza AA, Idris SA, Al-Haj MB, Mohammed AA. Prognostication of breast cancer using Nottingham prognostic index in Sudanese patients. International Journal of Public Health Research 2014;2(1):1-5.

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*

- *<u>Keywords</u>: 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

Asian Archives of Pathology (AAP) is an open access journal. Open Access makes your works freely available to everyone in the world. It provides a significant boost to the readership of your articles, and has been shown to have an increase in positive influence on citations and reuse. Hence, open-access leads to more recognition for our esteemed authors.

The 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.

Since AAP is also a peer-reviewed journal, the submitted manuscripts will be reviewed by the members of the Editorial Board or the expert reviewers. The decision on these manuscripts is processed very fast without any delay and in shortest possible time. The processing period is 1 – 2 weeks. These decisions of the reviewers are unbiased and the decision (reject, invite revision, and accept) letter coming from the Editorial Board is always conveyed to the authors.

APPENDIX 3
SUBMISSION OF THE MANUSCRIPTS

Step 1: Access www.asianarchpath.com

Step 2: If you did not register before, please create an account first.

Step 3: Login with your username and password.

Step 4: Click the "+ New Submission" button on the upper right-hand side of the page.

Step 5: Proceed to fill up the Submission Form online and follow the directions given therein.

Step 6: Upload your manuscript file (s).

Step 7: Re-check the content of your manuscript (s) and the uploaded file (s) more carefully prior to the submission. If you have submitted your manuscript file (s) incorrectly, you must contact Editor-in-Chief of Asian Archives of Pathology immediately. The Editor-in-Chief can clear the incorrect attempt and allow you another submission.

Step 8: Click the "Submit Manuscript" button under Important Notice.

If you have any further enquiries, please do not hesitate to contact the Journal.

APPENDIX 4
CONTACT THE JOURNAL

The Editorial Office of Asian Archives of Pathology

Department of Pathology, Floor 6, Her Royal Highness Princess Bejaratana Building
Phramongkutklao College of Medicine
317 Rajavithi Road, Rajadevi, Bangkok 10400 Thailand

Telephone: +66 (0) 90 132 2047

Fax: +66 (0) 2 354 7791

Email: editor@asianarchpath.com

APPENDIX 5
SUPPORT THE JOURNAL

Asian Archives of Pathology (AAP) has a mission of disseminating the unbiased and reliable medical knowledge on a non-profit basis. If you consider that this journal is useful for the public, you can support us by submitting your advertisements via the contact information below.

Assistant Professor Dr Chetana Ruangpratheep

The Editorial Office of Asian Archives of Pathology

Department of Pathology, Floor 6, Her Royal Highness Princess Bejaratana Building

Phramongkutklao College of Medicine

317 Rajavithi Road, Rajadevi, Bangkok 10400 Thailand

Telephone: +66 (0) 90 132 2047

Fax: +66 (0) 2 354 7791

Email: editor@asianarchpath.com

Every support, small or big, can make a difference.

Thank you

Assistant Professor Dr Chetana Ruangpratheep

MD, FRCPath (Thailand), MSc, PhD

Editor-in-Chief of Asian Archives of Pathology

ACADEMIC MEETINGS AND CONFERENCES

Announcements of academic meetings and conferences that are of interest to the readers of Asian Archives of Pathology (AAP) should be sent to the Editor-in-Chief at least 3 months before the first day of the month of issue. The contact information is shown below.

Assistant Professor Dr Chetana Ruangpratheep

The Editorial Office of Asian Archives of Pathology

Department of Pathology, Floor 6, Her Royal Highness Princess Bejaratana Building

Phramongkutklao College of Medicine

317 Rajavithi Road, Rajadevi, Bangkok 10400 Thailand

Telephone: +66 (0) 90 132 2047

Fax: +66 (0) 2 354 7791

Email: editor@asianarchpath.com

WHAT IS INSIDE THIS ISSUE?

Letter to the Editor:

The expression of *EN1* gene in cancer cells 1
Pasra Arnutti

Case Report:

Increased cardiac troponin T concentrations in a young obese man with chest pain and non-obstructive coronary arteries 3
Pusadee Luenee, Noppadol Arechep, Sudcharee Kiartivich, Sudarat Piyophirapong, Nattawut Wongpraparut and Kosit Sribhen

Technical Note:

Nottingham prognostic index (NPI) 10
Supakorn Piyaisrakul