

INDONESIAN JOURNAL OF **CLINICAL PATHOLOGY AND MEDICAL LABORATORY**

Majalah Patologi Klinik Indonesia dan Laboratorium Medik

EDITORIAL TEAM

Editor-in-chief:
Puspa Wardhani

Editor-in-chief Emeritus:
Prihatini
Krisnowati

Editorial Boards:

Maimun Zulhaidah Arthamin, AAG Sudewa, Rahayuning Sih Dharma, Mansyur Arif, July Kumalawati, Nurhayana Sennang Andi Nanggung, Aryati, Purwanto AP, Jusak Nugraha, Sidarti Soehita, Endang Retnowati Kusumowidagdo, Edi Widjajanto, Budi Mulyono, Adi Koesoema Aman, Uleng Bahrin, Ninik Sukartini, Kusworini Handono, Rismawati Yaswir, Osman Sianipar

Editorial Assistant:
Dian Wahyu Utami

Language Editors:
Yolanda Probahoesodo, Nurul Fitri Hapsari

Layout Editor:
Akbar Fahmi

Editorial Address:

d/a Laboratorium Patologi Klinik RSUD Dr. Soetomo Jl. Mayjend. Prof. Dr Moestopo 6–8 Surabaya, Indonesia
Telp/Fax. (031) 5042113, 085-733220600 E-mail: majalah.ijcp@yahoo.com, jurnal.ijcp@gmail.com
Website: <http://www.indonesianjournalofclinicalpathology.or.id>

Accredited No. 36a/E/KPT/2016, Tanggal 23 Mei 2016

INDONESIAN JOURNAL OF CLINICAL PATHOLOGY AND MEDICAL LABORATORY

Majalah Patologi Klinik Indonesia dan Laboratorium Medik

CONTENTS

RESEARCH

<p>Estimated Blood Loss in Open Heart Surgery (<i>Taksiran Kehilangan Darah di Bedah Jantung Terbuka</i>) Riesti Ekasanti, Rachmawati Muhiddin, Mansyur Arif.....</p> <p>Error Rate of Disc Diffusion Method in Ceftazidime/Cefotaxime Susceptibility Test on Clinical Isolates of Klebsiella Pneumoniae (<i>Laju Kesalahan Uji Kepekaan Ceftazidim/Cefotaxime Metode Difusi Cakram pada Klebsiella Pneumoniae</i>) Luz Maria GBW, Osman Sianipar, Usi Sukorini.....</p> <p>Correlation of Monocyte Count, MLR and NLCR with Presepsin Level in SIRS (<i>Hubungan Jumlah Monosit, MLR dan NLCR dengan Kadar Presepsin pada SIRS</i>) Nurmalia PS, N. Suci W, Imam BW.....</p> <p>Role of Signal Transduction ERK1/2 on the Proliferation of Endothelial Progenitor Cell (EPC) of Patients with Stable Angina Pectoris Induced by Growth Factors (<i>Peran Transduksi Sinyal ERK1/2 terhadap Proliferasi Endothelial Progenitor Cell (EPC) Pasien Angina Pekotoris Stabil yang Diinduksi oleh Faktor Pertumbuhan</i>) Yudi Her Oktaviono, Djanggan Sargowo, Mohammad Aris Widodo, Yanni Dirgantara, Angliana Chouw, Ferry Sandra.....</p> <p>Analysis of Mean Platelet Volume in Type II Diabetic Patients with Vascular Complication (<i>Analisis Mean Platelet Volume Pasien Diabetes Melitus Tipe II Komplikasi Vaskuler</i>) Mustakin, Liong Boy Kurniawan, Nurahmi, Ruland DN Pakasi.....</p> <p>The Automatic Microdilution-Broth in Sensitivity Testing of Acinetobacter Baumannii Isolates (<i>Microdilution-Broth Otomatis dalam Uji Kepekaan Isolat Acinetobacter Baumannii</i>) Dyah Artini, Osman Sianipar, Umi S Intansari.....</p> <p>Interleukin-8 Related with Bone Mineral Density (<i>Interleukin-8 terhadap Kepadatan Mineral Tulang</i>) Yurdiansyah Latif, Uleng Bahrun, Ruland Pakasi.....</p> <p>The Risk Factor of Alloantibody Formation in Thalassemia Patients Receiving Multiple Transfusion (<i>Faktor Kebahayaan Terbentuknya Aloantibodi pada Pasien Talasemia yang Menerima Transfusi Darah Berulang</i>) Veronica Fridawati, Teguh Triyono, Usi Sukorini.....</p> <p>Specific IgE Immunoblot Method in Allergic Rhinitis (<i>IgE Spesifik Menurut Metode Imunoblot di Rinitis Alergi</i>) Izzuki Muhashonah, Aryati, Dwi Reno Pawarti, M. Robi'ul Fuadi, Janti Trihabsari.....</p> <p>Metabolic Syndrome Among Adults in Rural Areas (<i>Sindrom Metabolik pada Dewasa di Daerah Pedesaan</i>) Fenty, Widayati A, Virginia DM, Hendra P</p>	<p>205–207</p> <p>208–211</p> <p>212–218</p> <p>219–226</p> <p>227–231</p> <p>232–236</p> <p>237–240</p> <p>241–245</p> <p>246–253</p> <p>254–257</p>
---	---

Glycated Albumin and HbA1c in Diabetic Nephropathy (Albumin Glikat dengan HbA1c dan Penyakit Nefropati Diabetik) Elvan Dwi Widiyadi, Jusak Nugraha, Ferdy Royland Marpaung	258–262
Small Dense Low Density Lipoprotein with Angiographically Atherosclerosis in Coronary Heart Disease (Small Dense Low Density Lipoprotein dengan Aterosklerosis Secara Angiografi di Penyakit Jantung Koroner) Yuliani Zalukhu, Siti Muchayat Purnamaningsih, Nahar Taufik, Suwarso	263–267
Total IgG and IgG Anti PGL-I with Duration of Therapy and Reactions of Multibaciller Leprosy (Jumlah Keseluruhan IgG dan IgG Anti PGL-I Mycobacterium leprae dengan Lama Pengobatan dan Reaksi Kusta Multibasiler) Endang Retnowati, Halik Wijaya, Indropo Agusni	268–273
Factors in Acute Transfusion Reaction (Faktor Reaksi Transfusi Darah Akut) Wiwi Payung, Rachmawati AM, Mansyur Arif	274–278
Neopterin and CD4+ T-Lymphocytes in Stage I HIV Infection (Neopterin dan Limfosit T-CD4+ di Infeksi HIV Stadium I) Harianah, Endang Retnowati, Erwin Astha Triyono	279–283

LITERATURE REVIEW

The Role of Platelets sCD40L to Atherogenesis (Peran sCD40L Trombosit terhadap Aterogenesis) Liong Boy Kurniawan	284–288
---	---------

CASE REPORT

Multiple Myeloma in a Young Adult (Mieloma Multipel di Dewasa Muda) Hendra Rasubala, Agus Alim Abdullah, Mansyur Arif	289–292
--	---------

Thanks to editors in duty of IJCP & ML Vol 22 No. 3 July 2016

Aryati, Ida Parwati, Purwanto AP, July Kumalawati, Puspa Wardhani, Rismawati Yaswir,
Kusworini Handono, Ninik Sukartini, Adi Koesoema Aman, Rahayuningsih Dharma,
AAG. Sudewa, Sidarti Soehita, Endang Retnowati

CASE REPORT

MULTIPLE MYELOMA IN A YOUNG ADULT*(Mieloma Multipel di Dewasa Muda)***Hendra Rasubala, Agus Alim Abdullah, Mansyur Arif****ABSTRAK**

Mieloma Multipel (MM) merupakan penyakit tertentu di individu yang berusia lanjut. Kejadian mieloma multipel di pasien berusia di bawah empat puluh tahun adalah sangat jarang. Mieloma multipel merupakan kasus keganasan sel plasma yang mengenai banyak tulang dengan gejala peningkatan protein monoklonal di serum/air kemih atau keduanya. Hal ini harus dibedakan dengan kasus peningkatan protein monoklonal yang lain seperti plasmacitoma soliter yang hanya terjadi di satu tulang. Dalam kasus ini dipaparkan pasien mieloma multipel laki-laki dewasa muda berumur 34 tahun, dengan hasil memerlukan laboratorik dan radiologis yang mendukung diagnosis mieloma multipel tertentu. Keluhan utama berupa nyeri punggung yang disertai dengan kondisi tulang yang rapuh di gambaran radiologik. Pasien dirawat di rumah sakit selama tujuh belas hari di ruang perawatan bagian Bedah Orthopedi Rumah Sakit Wahidin Sudirohusodo, Makassar. Pasien meninggal pada hari ke-17 sesaat setelah menjalani kemoterapi pertama. Gambaran laboratorik yang menonjol dan khas selama perawatan di rumah sakit seperti pemeriksaan hapsiran aspirasi sumsum tulang, pemeriksaan elektroforesis serum protein, hematologik rutin, laju endap darah, zat kimia klinik (seperti kalsium, asam urat, uji fungsi hati, ureum dan kreatinin) dan pemeriksaan radiologik berupa foto polos tulang. Dalam makalah ini akan dipaparkan secara jelas, sampai akhirnya penyakit ini didiagnosis beserta derajat dan perjalanan penyakitnya. Penanganan dan pengobatan pasien mieloma multipel selama perawatan inap di rumah sakit juga akan dipaparkan dengan jelas dalam makalah ini.

Kata kunci: Mieloma multipel, dewasa muda, gambaran laboratoris

ABSTRACT

Multiple Myeloma (MM) is a disease of elderly persons. The occurrence of multiple myeloma in patients younger than forty years is very rare. Multiple myeloma is plasma cell malignancy that affects many bones which show increasing serum/urine monoclonal protein or both. This should be distinguished from other increasing monoclonal protein cases such as a solitary plasmacytoma that affects only one bone. This case happened to be multiple myeloma in a 34-year-old male patient with laboratory and radiology results supporting with a multiple myeloma diagnosis. The main complaint was back pain accompanied by brittle bones on radiological images. The patient was hospitalized for seventeen days in Orthopedic Surgery's inpatient treatment room of Wahidin Sudirohusodo Hospital of Makassar. The patient died on day 17 immediately after the first chemotherapy. Prominent and specific laboratory findings during hospitalization such as examination of bone marrow aspiration smear, serum protein electrophoresis examination, routine hematology, erythrocyte sedimentation rate examination, clinical chemistry (such as calcium, uric acid, liver function tests, urea and creatinine) and radiological examination like the plain X Ray of bone will be clearly presented in this paper, so the disease is eventually diagnosed along with the degree and prognosis. Handling and treatment of multiple myeloma patients during inpatient treatment in hospital will also be clearly presented in this paper.

Key words: Multiple myeloma, young adult, laboratory findings

INTRODUCTION

Multiple Myeloma is a proliferating neoplastic plasma cell with clinical plasma cell malignancy in the bone marrow, anemia and increase of serum/urine monoclonal protein or both, injury of cells in bones, hypercalcemia and kidney insufficiency.^{1,2}

Multiple Myeloma phenomena which exists in black people is often more found than in white people and more often occurs in men than in females.^{2,3} Multiple Myeloma is commonly found in the age average above 71 years old, while in the age under 40 years old is it hardly found.^{4,5} A dangerous factor of Multiple

Myeloma is related to radiation frequency, workplace, life style, health track and treatment, gene, age and gender.^{6–8} The clinical multiple myeloma symptoms are anemia, chronic infection, polyuria, loss of appetite, vomiting, constipation, abnormal hemorrhagic tendency and amyloidosis (macroglossia, carpal tunnel syndrome and diarrhea).^{9,10}

CASE STUDY

A 34-year-old male was hospitalized in orthopedic room at Wahidin Sudirohusodo Hospital (WSH) of Makassar. The patient was diagnosed as multiple myeloma. On 4 March 2011, the patient was hospitalized in emergency room at WSH because of

Date	General condition and laboratory results	
04 th March 2011	Hemoglobin	5.4 g/dL
	Hematokrit: 16.8%	16.8%
	Erythrocyte sedimentation Hour I	110 mm
	Erythrocyte sedimentation Hour II	140 mm
	Ureum	71 mg/dL
	Creatinine	2.2 mg/dL
	Peripheral Blood evaluation	The picture of normocytic normochromic erythrocytes and anisopoikilocytosis with the shape of <i>rouleaux</i> , had sufficient number of leukocytes and dominant polymorphonuclear with toxic granulation and the increase of sufficient monocytes, platelet numbers with aggregation and the signs of normocytic normochromic anemia with the signs of paraproteinemia increase with monocytosis.
	Heart function Test	Within normal limits
	Electrolytes	
	Alcaline phosphatase	
06 th March 2011	Hemoglobin	9.4 g/dL
	Albumin	2.7 g/dL
	Globulin	3.1 g/dL
	Alcaline phosphatase	Within normal limits
	TSHs	
14 th March 2011	Bone marrow aspiration	The number of plasma cells increased more than 15% and there were myeloma cells among them, that were consistent with myeloma multiple.
	Uric acid	7.5 mg/dL
	Calcium	16.37 mg/dL
	Natrium	131 mmol/L
	Calium	2.7 mmol/L
	Chloride	94 mmol/L
17 th March 2011	Serum protein electrophoresis	Protein total: 9.9 g/dL Albumin: 3.02 g/dL Gamma-globulin: 5.19 g/dL Effet: M-spike in an area of gamma-globulin
	Natrium	124 mmol/L
	Calium	2.4 mmol/L
	Chloride	93 mmol/L
	Chest X Ray	Cardiomegaly picture and pulmonary edema
19 th March 2011	Hemoglobin	8.3 g/dL
	Ureum	107 mg/dL
	Creatinin	3.3 mg/dL
	Natrium	130 mmol/L
	Calium	2.8 mmol/L
	Chloride	99 mmol/L
	Bad prevalent condition	
	Diarrhea, asthma, decrease of consciousness	
20 th March 2011	The patient passed away at 08.40 Wita	

backache complaints for 4 months. The patient's body weight and loss of appetite had decreased in 4 months. Radiology examination showed some bruises in some bones (skull and backbone) which accurately showed multiple myeloma.

DISCUSSION

Multiple myeloma diagnosis has two criteria (Knowles). The main criterion is plasmacytoma in bone marrow and plasmacytosis (plasma cell >30%) and serum/urine monoclonal protein.¹¹ The minor criterion consists of bone marrow plasmacytosis (10–30%), serum/urine protein M components, bone bruises in the radiological images and the decrease of normal immunoglobulin.^{12–13} Multiple myeloma diagnosis is established if one of major criteria and one of minor criteria are found.¹¹

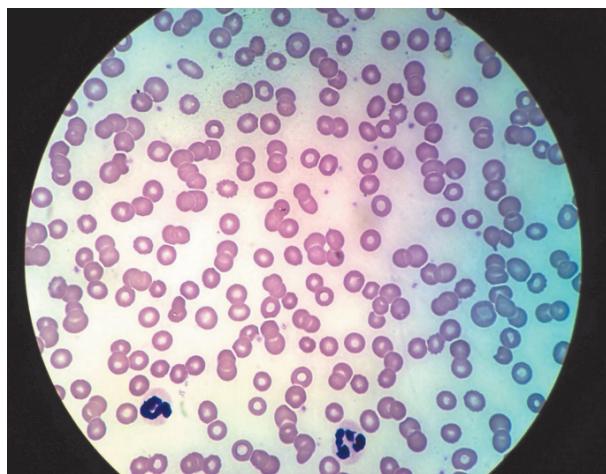


Figure 1. Peripheral blood smear shows the shape of *Rouleaux*

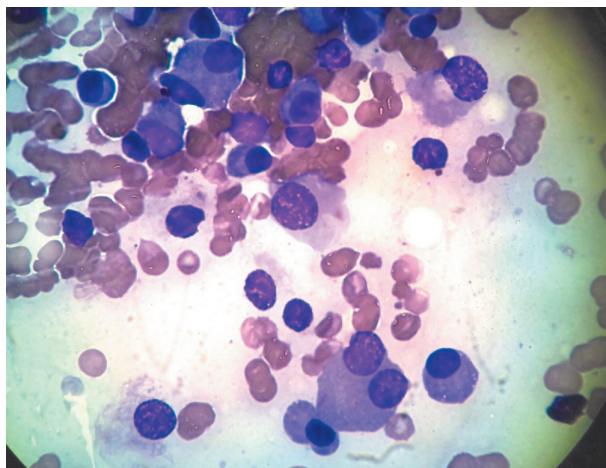
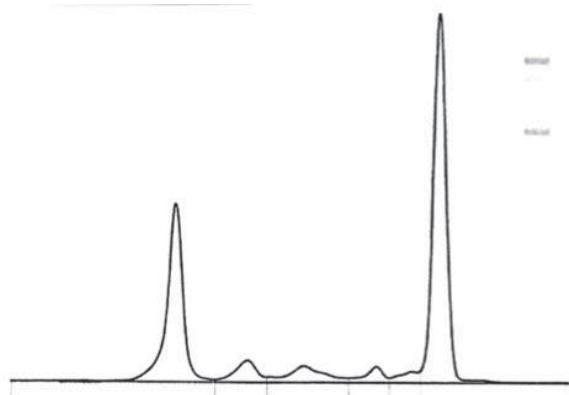


Figure 2. The bone marrow smear shows plasma cells with the presence of myeloma cells (red arrow: plasma cell with more than one nucleus).

Regarding to this case, a 34-year-old male patient became the focus object of this research. This case was a rare phenomenon because multiple myeloma has a frequent occurrence in 70 years old. The male patient complained about backache which suddenly happened to him until he could not stand and walk on his own. This ache is usually caused by bone damage especially in vertebral corpus which a spotted bruise could be easily found in bones with similar sizes. It also affected skulls. This damage happened due to the increase of osteoclast activity and the decline of osteoblast activity, so it caused the calcium serum increase too (16.37 mg/dL).

This case showed anemia along with the increase of Erythrocyte Sedimentation Rate (ESR) in the early laboratory examination. This showed that there was hyperviscosity which became the main reason for the increase of serum monoclonal protein. The result of peripheral blood showed normocytic normochromic anemia effect with the increase of paraproteinemia signals and monocytosis. The bone marrow aspiration strengthened the diagnosis according to the multiple myeloma picture. In protein serum electrophoresis, *M spike* images were found within gamma-globulin areas with the 5.19 g/dL (N: 1.00–1.70) value. This monoclonal protein caused heart disorder with the increase of ureum and creatinin level. The declining heart function caused electrolyte imbalance, such



Fractions	%	Ref. %	Conc.	Ref. Conc.	
Albumin	30.5	<	54.6 - 65.1	3.02	4.00 - 4.80
Alpha 1	5.1	>	2.5 - 4.5	0.50	0.20 - 0.30
Alpha 2	6.4	<	6.5 - 10.7	0.63	0.50 - 0.80
Beta 1	3.1	<	4.3 - 6.7	0.31	0.30 - 0.50
Beta 2	2.5		2.5 - 5.3	0.25	0.20 - 0.40
Gamma	52.4	>	13.9 - 23.5	5.19	1.00 - 1.70

Figure 3. The result of serum protein electrophoresis in a multiple myeloma patient shows the image of *M spike* in gamma-globulin with the value of 5.19 g/dL and decline of albumin with the value of (3.02 g/dL).

as hypocalcemia. Diarrhea made it more unbearable for hypocalcemia. This condition caused the patient to consciousness. Another laboratory examination showed uric acid value (7.5 mg/dL). At that moment, the patient was diagnosed to suffer from multiple myeloma III B (based on the *Durie-Salmon Staging System* knowles).¹³

During the treatment in the Orthopedic Surgery of WSH, the patient was with five units of blood transfused within three days to overcome his anemia. He was also given some nonpyrogenic solution for fluid like ringer lactate with 20 drops per minute. The ache treatment was done by giving him oral mefenamic acid with 500 mg dose 3 times per day and 30 mg ketorolac tromethamine which was given 3 times intravenously per day. Intravenous ranitidine dosage was given 3 times per day to treat the heartburn complaints. Oral melphalan chemotherapy with 500 mg three-time dose mixed with 0.8 mg/kg body weight metilprednisolon was applied in the patient. The kidney insufficiency and electrolyte imbalance due to diarrhea caused worsening of the patient's condition. Consequently, the patient died on day 17 soon after the chemotherapy was done.

CONCLUSION AND SUGGESTION

This study case was a multiple myeloma found in a young 34-year-old male and it was a rare phenomenon. The myeloma picture and plasma cell sedimentation in the bone marrow smear, the presence of *M spike* in serum protein electrophoresis, hypercalcemia, anemia with ESR increase and the image of spotted bruises in many bones became a specific identifications of multiple myeloma. The worsening of the patient's condition was casued by the presence of kidney

insufficiency and electrolyte imbalance. The patient died on day 17 after receiving the chemotherapy.

The identification of electrolyte is better to be routinely conducted during the patient's hospitalization so that the treatment and electrolyte correction can be better applied.

REFERENCES

1. Wintrobe MM. Multiple Myeloma. In: Clinical Hematology. 5th Ed., Philadelphia, Lea and Febiger, 1961; 1065–81.
2. Hoffbrand AV. Myeloma multiple dan Gangguan yang Terkait. Dalam: Kapita Selekta Hematologi. Ed. 4., Jakarta, EGC. 2005; 200–4.
3. Brown LM. Epidemiology of Multiple Myeloma. In: Neoplastic Diseases of the Blood. 4th Ed., United Kingdom, Cambridge University Press, 2003; 434–445.
4. Dispenzieri A, Lacy MQ, Greipp PR. Multiple Myeloma. In: Wintrobe's Clinical Hematology. 11th Ed., Philadelphia, Lippincott Williams & Wilkins. 2004; 2584–2622.
5. Durie BG. Epidemiology of Multiple Myeloma and Related Disease. In: Biology and Management of Multiple Myeloma. USA, Humana Press Inc. 2004; 13–31.
6. Singer CRJ. Multiple Myeloma and Related Conditions. In: ABC Clinical Haematology. 2nd Ed., London, BMJ Books. 2003; 37–42.
7. American Cancer Society. Multiple Myeloma. Atlanta, GA: American Cancer Society, 2011; 1–34.
8. Mehta AB, Hoffbrand AV. Myeloma. In: Haematology at a Glance. USA, Blackwell Science Ltd. 2000; 66–7.
9. Hoffbrand AV, Moss PAH. Multiple Myeloma and Related Disorders. In: Essential Haematology. 5th Ed., UK, Blackwell Publishing Ltd. 2006; 216–223.
10. Saif MW, Shannon K. Multiple Myeloma and HIV Infection: An Association or a Coincidence. In: The Journal of Applied Research. 2005; 5(2); 318–324.
11. Kern W. Multiple Myeloma, Monoclonal Gammopathies and Other Plasma Cell Dyscrasias. In: PDQ Hematology. 2002; 353–64.
12. Provan D *et al*. Paraproteinaemias. In: Oxford Handbook of Clinical Haematology. 2nd Ed., USA, Oxford University Press Inc. 2004; 266–83.
13. Shinton NK. Multiple Myeloma. In: Desk Reference for Hematology. 2nd Ed., USA, CRC Press, 2008; 640–2.

SUBJECT INDEX

VOLUME 22

- a cross-sectional, 264
Activated macrophages, 77
active TB, 137
acute coronary syndromes, 127
acute coronary synndrome, 114
Acute transfusion reaction, 274
adipocyte culture, 109
adults, 254
Allergic rhinitis, 114
Allergic rhinitis, 246
angiography, 264
anti-HIV, 182
atherogenesis, 284
Atherogenic index of plasma, 82
atherosclerosis, 264
autoimmune, 200
automatic microdilution-broth method, 232
biomarker, 194
biomarkers, immunoturbidimetry assay, 127
blood bank of the Dr.Wahidin Sudirohusodo general hospital, 133
Blood demand for surgery preparation, 133
blood glucose, 200
blood type, 274
bone mineral density, 237
canceled blood, 133
CD4⁺-IFN γ , 137
CD4⁺T-lymphocytes, 281
CD8⁺-IFN γ , 137
ceftazidime/cefotaxime, 208
chronic liver disease, 163
Clinical isolate A. baumannii, 232
COPD combined assessment GOLD criteria 2011, 168
COPD, 168
coronary heart disease, 264
C-peptide, 200
CRP, 187
cytokine, 92
diabetes mellitus, 227
diabetes mellitus, 258
diabetic ketoacidosis, 200
diabetic nephropathy, 258
diagnostic value, 114
disc diffusion, 208
Disease activity, 141
duration of therapy, 268
E test, 232
ELISA, 114
immunoblot, 114
eNOS gene polymorphism, 87
nitric oxide, 87
peri focal edema, 87
hemorrhagic stroke, 87
EPC, 220
ERK1/2, 220
Error rate, 208
ESRD, 187
Estimated blood loss, 205
factors, 274
fetuin A, 187
FIB-4 index, 151
fibroscan, 163
flare up, 141
Gamma delta T lymphocytes, 92
gamma interferon, 151
Glycated albumin, 258
growth factor, 220
H63D mutation, 176
HbA1c, 258
HbE disorder, 176
Heart-fatty acid-binding protein, 127
Hemodialysis, 182
hepatitis C, 147
HFE gene, 176
high glucose exposure, 109
high risk of exacerbation, 168
high throughput, 194
IgG anti PGL-I, 268
innate cell, 92
Interferon-Gamma, 141
interleukin-2, 151
Interleukin-4, 141
Interleukin-8, 237
King's Score, 163
Klebsiella pneumoniae, 208
laboratory findings, 289
latent TB, 137
liver fibrosis, 163
log (TG/HDL-C), 82
low risk of exacerbation, 168
Lupus Nephritis, 141
MALDI-TOF, 194
mass spectrometry, 194
Mean platelet volume, 227
Metabolic syndrome, 254
MLR, 212
Monocyte, 212
multibaciller, 268
Multiple myeloma, 289
multiple transfusion, 241
negative M protein, 99
Neopterin, 279
Neutrophil, 105

- lymphocyte, 105
neutrophil/lymphocyte ratio, 105
young adults, 105
NLCR, 212
Nonsecretory multiple myeloma, 99
open heart surgery, 205
osteolytic lesions, 99
osteopenic, 237
osteoporosis, 237
PBMC culture, 151
Phosphatidylinositol-3 kinase, 109
platelets, 284
PLT, 151
point of care testing, 114
presepsin, 212
protein profiling, 194
proteomic, 194
RDW, 151
reaction of leprosy, 268
retinol, 109
returned blood, 133
risk factor of alloantibody formation, 241
RPR, 151
rural area, 254
sCD40L, 284
sd-LDL, 264
SELDI-TOF, 194
serum neopterin, 77
serum peroxide, 77
serum phosphate, 187
Serum SP-D level, 168
skin prick test, 246
specific IgE due to HDM, 114
specific IgE immunoblot method, 246
Specific primer design, 158
macrophage mannose receptor gene, 158
polymerase chain reaction, 158
deoxyribo nucleic acid sequencing, 158
Stable angina pectoris, 220
stage I HIV infection, 279
subtype HIV, 182
T lymphocytes, 151
Thalassemia, 241
The 38 kDa recombinant protein of Mtb, 151
Total IgG total, 268
Troponin I, 114
troponin I, 127
Type 1 diabetes mellitus, 200
type 2 diabetes mellitus, 82
vascular, 227
whole blood, 114
young adult, 289

AUTHOR'S INDEX

VOLUME 22

- Amarensi M Betaubun, 82
Arie Yanti, 105
Betty Agustina Tambunan, 137
Dewi Nurhayati, 168
Dyah Artini, 232
Efrida, 27
Elvan Dwi Widyadi, 258
Endang Retnowati, 268
Fenty, 254
Glent Nurtanio, 38
Harianah, 279
Hendra Rasubala, 289
Herlinah, 133
I Nyoman Wande, 77
Ika Yasma Yanti, 22
Indranila K. Samsuria, 9
Indranila KS, 187
Ira Puspitawati, 127
Iskandar Zakaria 87
Izzuki Muhashonah, 246
Janti Tri Habsari, 119
Liong Boy Kurniawan, 284
Livia Noviani, 48
Liza, 55
Luz Maria GBW, 208
Maenaka Smaratungga, 65
Maimun Z Arthamin, 151
Maimun Zulhaidah Arthamin, 99
Mustakin, 227
Novi Khila Firani, 109
Nuri Dyah Indrasri, 1
Nurmalia PS, 212
Retno Handajani, 182
Riesti Ekasanti, 205
Sheila Febriana, 60
Sheila Febriana, 114
Sriwati Atjo, 34
Tiwik Eriskawati, 16
Torajasa Achamar, 141
Trinovia Andayaningsih, 194
Umi S. Intansari, 42
Veronica Fridawati, 241
Wira, 163
Wiwi Payung, 274
Yani Triyani, 158
Yanuarita Tursinawati, 176
Yenny Yulianti, 147
Yudi Her Oktaviono, 219
Yulia Nadar Indrasari, 92
Yuliani Zalukhu, 263
Yulianti Yasin, 72
Yurdiansyah Latif, 237
Zuhrinah Ridwan, 200