KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
UNIVERSITAS AIRLANGGA
Kampus C Mulyorejo Surabaya 60115 Telp. (031) 5914042, 5914043, Fax (031) 5981841
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SALINAN

KEPUTUSAN
REKTOR UNIVERSITAS AIRLANGGA
NOMOR 346/UN3/2020

TENTANG

PELAKSANAAN PENELITIAN INTERNAL UNIVERSITAS AIRLANGGA HIBAH RESEARCH GROUP, HIBAH RISET MANDAT, RISET KOLABORASI MITRA LUAR NEGERI, PENELITIAN UNGGULAN FAKULTAS, PENELITIAN DOSEN PEMULA DAN *ARTICLE REVIEW* PROGRAM TAHUN 2020

REKTOR UNIVERSITAS AIRLANGGA,

Menimbang : a. bahwa sesuai hasil seleksi proposal penelitian hibah riset mandat, penelitian unggulan fakultas dan penelitian dosen pemula Universitas Airlangga Tahun 2020 sebagai salah satu wujud dari pelaksanaan tridharma perguruan tinggi, maka perlu menetapkan para peneliti dan judul penelitian dimaksud;

b. bahwa berdasarkan pertimbangan sebagaimaan dimaksud pada huruf a, perlu menetapkan Keputusan Rektor tentang Pelaksanaan Penelitian Internal Universitas Airlangga Hibah Research Group, Hibah Riset Mandat, Riset Kolaborasi Mitra Luar Negeri, Penelitian Unggulan Fakultas, Penelitian Dosen Pemula Dan *Article Review* Program Tahun 2020;

Mengingat : 1. Undang–Undang Nomor 20 Tahun 2003 tentang Sistem Pendidikan Nasional (Lembaran Negara Republik Indonesia Tahun 2003 Nomor 78, Tambahan Lembaran Negara Nomor 4301);
2. Undang–Undang Nomor 12 Tahun 2012 tentang Pendidikan Tinggi (Lembaran Negara Republik Indonesia Tahun 2012 Nomor 158, Tambahan Lembaran Negara Tahun 2012 Nomor 5336);
3. Peraturan Pemerintah Nomor 57 Tahun 1954 tentang Pendirian Universitas Airlangga di Surabaya sebagaimana telah diubah dengan Peraturan Pemerintah Nomor 3 Tahun 1955 tentang Pengubahan Peraturan Pemerintah Nomor 57 Tahun 1954 (Lembaran Negara Republik Indonesia Tahun 1954 Nomor 99 Tambahan Lembaran Negara Nomor 695 juncto Lembaran Negara Republik Indonesia Tahun 1955 Nomor 4 Tambahan Lembaran Negara Nomor 748);

4. Peraturan Pemerintah Nomor 37 Tahun 2009 tentang Dosen (Lembaran Negara Republik Indonesia Tahun 2009 Nomor 76, Tambahan Lembaran Negara Republik Indonesia Nomor 5007);
5. Peraturan Pemerintah Nomor 4 Tahun 2014 tentang Penyelenggaraan Pendidikan Tinggi dan Pengelolaan Perguruan Tinggi (Lembaran Negara Republik Indonesia Tahun 2014 Nomor 16, Tambahan Lembaran Negara Nomor 5500);
6. Peraturan Pemerintah Nomor 30 Tahun 2014 tentang Statuta Universitas Airlangga (Lembaran Negara Republik Indonesia Tahun 2014 Nomor 100, Tambahan Lembaran Negara Nomor 5535);
7. Peraturan Pemerintah Nomor 8 Tahun 2020 tentang Perubahan Atas Peraturan Pemeerintah Nomor 26 Tahun 2015 tentang Bentuk dan Mekanisme Pendanaan Perguruan Tinggi Negeri Badan Hukum (Lembaran Negara Republik Indonesia Tahun 2020 Nomor 28, Tambahan Lembaran Negara Republik Indonesia Nomor 6461);
8. Keputusan Majelis Wali Amanat Universitas Airlangga Nomor 1032/UN3.MWA/K/2015 tentang Pengangkatan Rektor Universitas Airlangga Periode 2015-2020;
9. Peraturan Rektor Universitas Airlangga Nomor 39 Tahun 2017 tentang Perubahan Atas Peraturan Rektor 42 Tahun 2016 tentang Organisasi dan Tata Kerja Universitas Airlangga;
10. Peraturan Rektor Universitas Airlangga Nomor 3 Tahun 2019 tentang Perubahan Kedua Atas Peraturan Rektor Nomor 27 Tahun 2018 tentang Pedoman Pendidikan Universitas Airlangga;
11. Keputusan Rektor Universitas Airlangga Nomor 1280/UN3/2015 tentang Pembentukan Lembaga Penelitian dan Inovasi;
12. Keputusan Rektor Universitas Airlangga Nomor 1285/UN3/2015 tentang Pengangkatan Ketua pada Lembaga dan Kepala Perpustakaan di Lingkungan Universitas Airlangga.

Memperhatikan : Surat Ketua lembaga penelitian dan Inovasi Universitas Airlangga Nomor 398/UN3.14/LT/2019, tanggal 21 Maret 2019, perihal Permohonan SK tentang Pelaksanaan Penelitian Internal Universitas Airlangga Tahun 2019.

MEMUTUSKAN :

MENETAPKAN : **KEPUTUSAN REKTOR TENTANG PELAKSANAAN PENELITIAN INTERNAL UNIVERSITAS AIRLANGGA HIBAH RESEARCH GROUP, HIBAH RISET MANDAT, RISET KOLABORASI MITRA LUAR NEGERI, PENELITIAN UNGGULAN FAKULTAS, PENELITIAN DOSEN PEMULA DAN *ARTICLE REVIEW* PROGRAM TAHUN 2020.**

KESATU : Menetapkan hasil seleksi proposal penelitian internal Universitas Airlangga Hibah Research Group, Hibah Riset Mandat, Riset Kolaborasi Mitra Luar Negeri, Penelitian Unggulan Fakultas, Penelitian Dosen Pemula Dan *Article Review* Program Tahun 2020.

KEDUA : Penerima Hibah Research Group, Hibah Riset Mandat, Riset Kolaborasi Mitra Luar Negeri, Penelitian Unggulan Fakultas, Penelitian Dosen Pemula Dan *Article Review* Program Tahun 2020 sebagaimana dimaksud pada diktum KESATU sebanyak 7 (tujuh) judul Hibah *Research Group*, 53 (lima puluh tiga) judul Hibah Riset Mandat dan Hibah Riset Mandat Dosen Muda, dan 50 (lima puluh) judul Riset Kolaborasi Mitra Luar Negeri, 205 (dua ratus lima) judul Penelitian Unggulan Fakultas, 92 (sembilan puluh dua) judul Penelitian Dosen Pemula, 24 (dua puluh empat) judul *Article Review* dengan susunan nama tim peneliti sebagaimana tercantum dalam lampiran yang merupakan bagian tidak terpisahkan dari Keputusan Rektor ini.

KETIGA : Biaya untuk pelaksanaan penelitian sebagaimana dimaksud pada diktum KEDUA adalah:

1. Hibah Research Group sebesar Rp 3.500.000.000 (tiga milyar Rupiah) dibebankan pada dana dibebankan pada dana RKAT Lembaga Penelitian dan Inovasi;
2. Hibah Riset Mandat dan Hibah Riset Mandat Dosen Muda sebesar Rp.11.630.325.650 (sebelas milyar enam ratus tiga puluh juta tiga ratus dua puluh lima ribu enam ratus lima puluh rupiah) dibebankan pada dana RKAT Lembaga Penelitian dan Inovasi;
3. Riset Kolaborasi Mitra Luar Negeri sebesar Rp 4.517.799.492 (empat milyar lima ratus tujuh belas juta tujuh ratus sembilan puluh sembilan ribu empat ratus sembilan puluh dua rupiah) dibebankan pada dana RKAT Lembaga Penelitian dan Inovasi;
4. Penelitian Unggulan Fakultas sebesar Rp. 7.321.435.400 (tujuh milyar tiga ratus dua puluh satu juta empat ratus tiga puluh lima ribu empat ratus rupiah) dibebankan pada RKAT masing-masing Fakultas;
5. Penelitian Dosen Pemula sebesar Rp. 2.105.323.750 (dua milyar seratus lima juta tiga ratus dua puluh tiga ribu tujuh ratus lima puluh rupiah) dibebankan pada RKAT masing-masing Fakultas;
6. *Article Review* Program sebesar Rp 1.197.887.257 (satu milyar seratus sembilan puluh tujuh juta delapan ratus delapan puluh tujuh ribu dua ratus lima puluh tujuh rupiah) dibebankan pada dana RKAT Lembaga Penelitian dan Inovasi.

KEEMPAT : Dalam melaksanakan tugasnya, penerima dana penelitian sebagaimana dimaksud pada diktum KEDUA, bekerja secara jujur dan transparan dengan berpedoman pada ketentuan peraturan perundang-undangan yang berlaku, serta bertanggungjawab kepada Rektor melalui Dekan pada Fakultas masing-masing.

KELIMA : Jangka waktu pelaksanaan penelitian sebagaimana dimaksud pada diktum KESATU berlaku sampai 31 Desember 2020.

KEENAM : Keputusan Rektor ini mulai berlaku surut sejak 1 maret 2020.

Salinan disampaikan Yth:
1. Pimpinan Unit Kerja di Lingkungan Unair
2. Yang bersangkutan

Ditetapkan di Surabaya
pada tanggal 27 Maret 2020

REKTOR,

ttd

MOHAMMAD NASIH
NIP.196508061992031002

Salinan sesuai dengan aslinya
Sekretaris Universitas,

KOKO SRIMULYO
NIP 196602281990021001

LAMPIRAN II KEPUTUSAN REKTOR UNIVERSITAS AIRLANGGA
NOMOR : 346/UN3/2020, TANGGAL 27 MARET 2020
TENTANG : PELAKSANAAN PENELITIAN INTERNAL UNIVERSITAS AIRLANGGA HIBAH RESEARCH GROUP, HIBAH RISET MANDAT, RISET KOLABORASI MITRA LUAR NEGERI, PENELITIAN UNGGULAN FAKULTAS, PENELITIAN DOSEN PEMULA DAN ARTICLE REVIEW PROGRAM TAHUN 2020

DAFTAR PROPOSAL PENELITIAN UNGGULAN FAKULTAS YANG LOLOS UNTUK DIDANAI TAHUN 2020

NO	TIM PENELITI	NIP	DOSEN NON UNAIR		NIM	SKEMA PENELITIAN	Fakultas / Nama Research Group	JUDUL PENELITIAN	DANA
1	Jan Ady S.Si., M.Si. (ketua), Drs. Djony Izak Rudyardjo, M.Si	`197201262002121002 , `196802011993031004,		Astrid Puspita Setya Ariyanto, Nadia Safira,	`081611333026, `081611333084,	Penelitian Unggulan Fakultas	Sains dan Teknologi / Biomaterial	Optimasi Pembentukan Biomaterial Biokeramik Nanopartikel Polimorfik Trikalsium Fosfat Menggunakan Metode Sinter dan Sol-Gel	Rp 40.000.000
2	Suciati S.Si. Apt., M.Phil, PhD (ketua), Rr. Retno Widyowati, M.Pharm., Ph.D., Apt. Dr. Wiwied Ekasari, M.Si., Apt.	`197911042005012001 , `197701052002122002, 196901221994032001,		Debora Poerwantoro, Lailatul Zakiyah Gifanda, Anita Probo Hapsari,	`051611133089, `051611133141, `051611133063,	Penelitian Unggulan Fakultas	Farmasi / NATURAL PRODUCT DRUG DISCOVERY	Evaluasi Aktivitas Antioksidan dari beberapa Ekstrak Tanaman Cassia moschata serta Profil Metabolitnya	Rp 40.000.000
3	Dr. Dewi Isadiartuti M.Si., Apt (ketua), Prof. Dr. Dwi Setyawan, M.Si., Apt. Helmy Yusuf, M.Sc., Ph.D., Apt.	`196505201991022001 , `197111301997031003, `197907152003121002,		Gusti Ayu Manik Suartha Putri, Mega Meiana Putri, Ella Yurika, Luh Putu Ariyani Pratiwi,	`051611133135, `051611133014, `051611133032, `051611133153,	Penelitian Unggulan Fakultas	Farmasi / Rekayasa bahan aktif farmasi	PEMBENTUKAN KOMPLEKS INKLUSI ASAM PARA-METOKSISINAMAT DENGAN HIDROKSIPROPIL-B-SIKLODEKSTRIN YANG DIBUAT DENGAN METODE CO-GRINDING	Rp 40.000.000
4	Dr. Praptini Yulianti SE.,M.Si. (ketua), Dr. Ahmad Rizki Sridadi, SH.,MM.,MH., Nidya Ayu Arina, SM.,MSM.,	195807191994032001 , 197610292002121002, 198908162019032027,		Refita Syaiskha Prameswari, Nancy Rosminingsih Tomanda,	`041814153023, `041824153015,	Penelitian Unggulan Fakultas	Ekonomi dan Bisnis / Center for Sociopreneur & Digitalpreneur	Family Support to Business Performance on Women Entrepreneurs	Rp 40.000.000
5	Dr. Enny Narwati S.H., M.H. (ketua), A. Indah Camelia, S.H., MH.	`196412111990022001 , `198209152010122002,		Fa izin Achmad Sumhudi, Auly Nahdyan Mafaza,	`031711133233, `031711133061,	Penelitian Unggulan Fakultas	Hukum / GRUP RISET HUKUM INTERNASIONAL AIRLANGGA	Meningkatkan Peran Maritim Indonesia dalam Pengaturan Keselamatan Pelayaran Internasional pada Alur Laut Kepulauan Indonesia (ALKI) IIIB Pasca Adopsi Traffic Separation Scheme Selat Lombok	Rp 36.500.000
6	Mefina Kuntjoro drg., SpPros.,M.Kes. (ketua), Eric Priyo Prasetyo, drg., M.Kes., Sp.KG(K). Dr. Nike Hendrijantini, drg., M.Kes., Sp.Pros(K)	197909292006042002 , 198101142006041003, 195910061986012001,		Marvin Rusli, Marcella Theodora,	`021918076306, `021918076307,	Penelitian Unggulan Fakultas	Kedokteran Gigi / Tissue Engineering & Regenerative Medicine	Advance Glycation End Product (AGEs) induce hUCMSCs Intrinsic Apoptotic Pathway via APAF1, Caspace 3 and Caspace 9	Rp 20.000.000

NO	TIM PENELITI	NIP	DOSEN NON UNAIR		NIM	SKEMA PENELITIAN	Fakultas / Nama Research Group	JUDUL PENELITIAN	DANA
77	Hayuris Kinandita Setiawan, dr., M.Si (ketua), Dr. Lilik Herawati dr., M.Kes., AIFO Dr. Bambang Purwanto, dr., M.Kes	`19750314200312200 1 , `19800828200604 1002, `19820507200812 2003,		Arina Windri Rivarti, Eka Arum Cahyaning Putri,	`01 1914153001, `01 1914553003,	Penelitian Unggulan Fakultas	Kedokteran / RESEARCH GROUP KESEHATAN OLAHRAGA	Upaya Pencegahan Demensia melalui Identifikasi Perbedaan Respon Latihan Fisik Aerobik Weight Bearing dan Non-Weight Bearing Terhadap Peningkatan Memori, Kadar GH Darah, dan Kadar IGF-1 Hipokampus	Rp 40.000.000
78	Ananda Firman Putranto drg. M.Kes (ketua), R. Mohammad Yogiartono, drg., M.Kes. Regina Purnama Dewi Iskandar, drg.	`19861120201504 1001 , `19560203198403 1004, `19940524201802 7201,		Ratna Nurlia Alfiandini, Raden Aditya Wisnu Wardana,	`021918066308, `021818066311,	Penelitian Unggulan Fakultas	Kedokteran Gigi / Dental Materials & Biomaterials	Pengaruh Pemberian Kombinasi Electrolyzed Reduced Water dan Epigallocathecin Gallate Terhadap Ekspresi NF-kB, MMP-8 dan TGF-B Pada Relaps Gigi Ortodonti	Rp 20.000.000
79	Gilang Rasuna Sabdho Wening drg.,M.Kes. (ketua), Satiti Kuntari, drg., MS., Sp.KGA(K). Ardianti Maartrina Dewi, drg., M.Kes., Sp.KGA.	`19860818201012 1006 , `19550718198002 2001, `19830314201012 2006,		Nabil Ageng Dwiputra, Muhammad Faisal, Ragil Maulana, Kezia Aziza, Jael Segah Mahamiano Ludjen, Allisia Shafa Safira, Mifta Izha Affirda Rahmi, Jesica Ceren Kristiane Palevi,	`021823143103, `021923143059, `021923143131, `021823143105, `021711133009, `021923143017, `021923143032, `021923143022,	Penelitian Unggulan Fakultas	Kedokteran Gigi / Dental public health and primary health care	Faktor yang berpengaruh pada kejadian stunting ditinjau dari tingkat literasi kesehatan gigi ibu dan kesehatan gigi anak di Kota Surabaya	Rp 25.000.000
80	Citra Hennida S.IP..MA (ketua), Dr. Phill. Siti Rokhmawati Susanto, S.IP., MIR I Gede Wahyu Wicaksana, S.IP.,M.Si.,Ph.D	`19791025200604 2001 , `19770301200003 2001, `19790602200710 1001,		Ni Md Citra Kusuma Dewi, Naomi Devi Larasati, Demas Nauvarian,	`071611233061, `071611233067, `071711233060,	Penelitian Unggulan Fakultas	Ilmu Sosial dan Ilmu Politik / Centre for Global and Startegic Studies (CSGS)	Diplomasi dan Komunikasi Publik Pemerintah sebagai Bagian dari Mitigasi Bencana Wabah Virus Corona	Rp 40.000.000
81	Martono Tri Utomo dr., Sp.A.(K) (ketua), Mahendra Tri Arif Sampurna, dr., Sp.A Dr. Risa Etika, dr., Sp.A(K)	`19730126199903 1002 , `19830125201504 1001, `19590703201601 6201,		Oktavian Prasetia Wardana, Aminuddin Harahap, Setya Mithra Hartiastuti,	`011929049305, `011929049304, `011829049302,	Penelitian Unggulan Fakultas	Kedokteran / NEONATAL RESEARCH GROUP	EFEK SUPPLEMENTASI L â€"GLUTAMIN ENTERAL PADA BAYI PASKA OPERASI OBSTRUKSI SALURAN CERNA DI RSUD DR. SOETOMO: RANDOMIZED CONTROL TRIAL	Rp 39.000.000
82	Dr. Lucia Yovita Hendrati S.KM., M.Kes. (ketua), Ayik Mirayanti Mandagi, S.KM., M.Kes. Jayanti Dian Eka Sari, S.KM., M.Kes. Nurul Fitriyah, S.KM., M.PH.	`19681019199503 2001 , `19880122201504 2002, `19840917201504 3201, `19751121200501 2002,		Annisa Nur Illahi, Hadyan Adi Darma, Salsabila Shalihah Danar Putri, Roza Fitriani,	`101611133191, `101611133214, `101611133151, `101611133139,	Penelitian Unggulan Fakultas	Kesehatan Masyarakat / Healthy School	Peranan sekolah dalam memonitoring kelelahan pelajar melalui perkembangan sistem surveillans anak sekolah	Rp 36.000.000

Kode/Nama Rumpun Ilmu : 277/Ilmu Penyakit Anak

LAPORAN AKHIR

PENELITIAN UNGGULAN FAKULTAS 2020

EFEK SUPPLEMENTASI *L –GLUTAMIN ENTERAL* PADA BAYI PASKA OPERASI OBSTRUKSI SALURAN CERNA DI RSUD DR. SOETOMO: *RANDOMIZED CONTROL TRIAL*

PENGUSUL

1.	Dr. Martono Tri Utomo,dr., Sp.A(K)	NIDN. 0026017304
2.	Mahendra Tri Arif Sampurna, dr., SpA	NIDN. 0025018302
3.	Dr. Risa Etika, dr., SpA(K),	NIDK. 8817800016
4.	Kartika Darma H., dr., SpA(K)	RSUD dr. Soetomo
5.	Dina Angelika, dr., SpA (K)	RSUD dr. Soetomo
6.	Agus Harianto, dr., SpA(K)	NIDN. 9900980419
7.	Setya Mithra Hardiastuti, dr., SpA	Fakultas Kedokteran

FAKULTAS KEDOKTERAN

UNIVERSITAS AIRLANGGA

MARET 2021

HALAMAN PENGESAHAN

PENELITIAN UNGGULAN FAKULTAS*

Judul Penelitian	: Efek supplementasi L-glutamin enteral pada bayi paska operasi obstruksi saluran cerna di RSUD dr. Soetomo: *randomized control trial*
Kode/Nama Rumpun Ilmu	: 277/ Ilmu Penyakit Anak
Ketua Peneliti	
a. Nama Lengkap	: Dr. Martono Tri Utomo, dr., Sp.A(K)
b. NIDN	: 0026017304
c. Jabatan Fungsional	: Lektor Kepala
d. Program Studi	: Ilmu Kesehatan Anak
e. Nomor HP	: 081703667063
f. Alamat surel (*e-mail*)	: mrmartono73@gmail.com
Anggota Peneliti (1)	
a. Nama Lengkap	: Mahendra Tri Arif Sampurna, dr., Sp.A(K)
b. NIDN	: 0025018302
c. Fakultas	: Fakultas Kedokteran
Anggota Peneliti (2)	
a. Nama	: Dr. Risa Etika, dr., Sp.A(K)
b. NIDK	: 8817800016
c. Fakultas	: Fakultas Kedokteran
Anggota Peneliti (3)	
a. Nama Lengkap	: Kartika Darma H., dr., Sp.A(K)
b. NIDN	: -
c. Fakultas	: Fakultas Kedokteran
Anggota Peneliti (4)	
a. Nama Lengkap	: Dina Angelika, dr., Sp.A(K)
b. NIDN	: -
c. Fakultas	: Fakultas Kedokteran
Anggota Peneliti (5)	
a. Nama Lengkap	: Agus Hariyanto, dr., Sp.A(K)
b. NIDN	: 9900980419
c. Fakultas	: Fakultas Kedokteran
Anggota Peneliti (6)	
a. Nama Lengkap	: Setya Mithra Hardiastuti, dr., SpA
b. NIDN	: -
c. Fakultas	: Fakultas Kedokteran
Biaya Penelitian	**:** Rp. 39.600.000,00

Surabaya, 20 Maret 2021

Mengetahui,
Ketua Peneliti,

Dr. Martono Tri Utomo, dr., Sp.A(K)
NIP 197301261999031002

IDENTITAS DAN URAIAN UMUM

1. **Judul Penelitian :** Efek supplementasi *l –glutamin enteral* pada bayi paska operasi obstruksi saluran cerna di rsud dr. Soetomo: *randomized control trial*

2. **Tim Peneliti**

No	Nama	Jabatan	Bidang Keahlian	Fakultas Asal
1.	Dr. Martono Tri Utomo,dr., Sp.A(K)	Ketua	Ilmu Kesehatan Anak	Kedokteran
2.	Mahendra Tri Arif Sampurna, dr., SpA	Anggota 1	Ilmu Kesehatan Anak	Kedokteran
3.	Dr. Risa Etika, dr., SpA(K)	Anggota 2	Ilmu Kesehatan Anak	Kedokteran
4.	Kartika Darma H., dr., Sp.A(K)	Anggota 3	Ilmu Kesehatan Anak	Kedokteran
5.	Dina Angelika, dr., Sp.A(K)	Anggota 4	Ilmu Kesehatan Anak	Kedokteran
6.	Agus Hariyanto, dr. Sp.A(K)	Anggota 5	Ilmu Kesehatan Anak	Kedokteran
7.	Sethya Mitra Hardiastuti, dr., Sp.A	Anggota 6	Ilmu Kesehatan Anak	Kedokteran

3. **Objek Penelitian**
   Bayi dengan gangguan obstruksi saluran cerna pasca operasi yang memenuhi kriteria inklusi dan eksklusi yang lahir di RSUD.DR. Soetomo Surabaya yang akan dikelompokkan secara random
   Masa Pelaksanaan
   Mulai : Maret 2020
   Berakhir : Januari 2021
4. **Usulan Biaya :** Rp. 39.600.000,00
5. **Lokasi Penelitian :** NICU RSUD Dr. Soetomo, Surabaya.
6. **Instansi lain yang terlibat**
   PT Tropika
7. **Temuan yang ditargetkan**
   Mengetahui tingkat toleransi nutrisi enteral dan pemulihan berat badan
8. **Kontribusi mendasar pada suatu bidang ilmu**
   Penelitian ini diharapkan dapat menjadi dasar implementasi terapi nutrisi glutamin daam mengatasi permsalahan-permasalahan pada bayi dengan paska operasi obstruksi saluran cerna.

RINGKASAN

Obstruksi saluran cerna pada bayi dapat disebabkan oleh berbagai macam faktor dengan presentasi klinis yang bervariasi dengan beberapa sekuelae yang dapat mengikutinya, salah satu diantaranya adalah penurunan keefektifan asupan nutrisi dan gangguan pertumbuhan pada bayi (Hajivaissilou, 2003) Penelitian sebelumnya membuktikan bahwa vitamin dengan dosis 400 mg pada bayi baru lahir dengan berat lahir rendah mampu memperbaiki sistem imun toleransi enteral feeding serta berperan dalam memulihkan berat badan dan peningkatan kecepatan penambahan berat badan bayi (Sampurna, 2018) Terkhusus untuk saluran cerna sendiri, glutamin yang juga merupakan asam amino yang penting untuk saluran cerna dalam menjaga integritas mukosa dan menurunkan translokasi bakteri (Neu et. al., 1997) , glutamin bahkan diduga dapat mengurangi volume cairan intraluminal usus pada kasus obstruksi (Chang, 2001) Metode penelitian adalah penelitian eksperimental dengan uji klinik berupa pemberian terapi nutrisi enteral pada *human subject* dalam hal ini adalah bayi dengan paska bedah saluran cerna di RSUD dr. Soetomo Surabaya yang memenuhi kriteria inklusi dan eksklusi untuk diikutkan sebagai sampel dalam penelitian. Bahan uji adalah L- Glutamin yang merupakan sediaan kapsul 250 mg dipecah dalam dosis terbagi menurut frekuensi pemberian minum bayi. Sediaan ini dipasarkan oleh industri farmasi PT Tropica Mas dengan merek dagang Glutrop. L-Glutamin diberikan pada kelompok studi dengan dosis 400mg/kgBB/hari sebagai tambahan disamping standar asuhan nutrisi RSUD dr. Soetomo. Selain itu, akan pula ditentukan kelompok kontrol yang hanya diberikan standar asuhan nutrisi sesuai protokol. Luaran yang dinilai adalah dengan mempertimbangkan kecepatan toleransi nutrisi enteral, yang merupakan waktu yang dibutuhkan bayi untuk dapat mampu minum 120cc/kgBB/hari dan pemulihan berat badan yang didefinisikan sebagai waktu yang dibutuhkan untuk kembalinya berat badan seperti saat sebelum operasi dari penurunan berat badan terendah pada bayi akibat bedah saluran cerna dan tidak disebabkan oleh edema. Penilaian pada parameter ini nantinya akan menjadi dasar peranan asam amino glutamin sebagai supplemen untuk sebagai terapi nutrisi pada bayi dengan paska bedah saluran cerna. Selain dari manfaat klinis, penelitian ini pun nantinya juga memiliki target capaian untuk publikasi internasional.

Keywords: Glutamine; Obstruksi; Enteral Feeding; Toleransi nutrisi; Supplementasi

DAFTAR ISI

BAB 1
PENDAHULUAN

Banyak bayi lahir dengan kelainan bawaan saluran cerna yang lahir di Sutomo dengan komplikasi sepsis dan gangguan integritas mukosa. Bayi Ini akhirnya mendapatkan parenteral nutrition dan tertunda pemberian enteral nutritionnya.

Glutamin sebagai suatu kondisional esensial amino asi sangat diperlukan pada saat bayi mengalami sakit. Glutamin memiliki efek dalam menjaga integritas mukosa sistem imun dan meningkatkan peristaltik sehingga nutrisi enteral dapat diberikan dengan lebih cepat.

Penelitian sebelumnya telah membuktikan bahwa vitamin dengan dosis 400 mg pada bayi baru lahir dengan berat lahir rendah mampu memperbaiki sistem imun toleransi enteral feeding dan pola kenaikan berat badannya (Sampurna, 2018). Penelitian ini diharapkan mampu melihat Bagaimana efek pemberian glutamine secara enteral pada bayi dengan gangguan obstruksi saluran cerna pasca operasi.

1.1 Rumusan Masalah

- Apakah efek suplementasi glutamin enteral terhadap toleransi nutrisi enteral pada bayi dengan obstruksi saluran cerna paska operasi?
- Apakah efek suplementasi glutamin enteral terhadap pemulihan berat badan pada bayi dengan obstruksi saluran cerna paska operasi?

1.2 Tujuan Penelitian

1.2.1. Tujuan Umum

Tinjauan kepustakaan ini bertujuan untuk menjelaskan peran glutamin sebagai nutrisi pada Bayi dengan obstruksi saluran cerna.

1.2.2. Tujuan Khusus

1. Menjelaskan efek suplementasi glutamin enteral terhadap toleransi nutrisi enteral pada bayi paska operasi obstruksi saluran cerna.
2. Menjelaskan efek suplementasi glutamin enteral terhadap pemulihan berat badan pada bayi paska operasi obstruksi saluran cerna.

1.3 Luaran Penelitian

Penelitian ini diharapkan dapat memberikan acuan terkait supplementasi glutamin sebagai terapi nutrisi dalam praktik klinik terhadap parameter kecepatan toleransi nutrisi dan pemulihan berat badan pada bayi dengan paska bedah obstruksi saluran cerna.

Selain itu, penelitian ini direncanakan akan dipublikasikan dalam jurnal ilmiah internasional

bereputasi pada *Turk Pediatri Arsivi*.

BAB 2
TINJAUAN PUSTAKA

2.1 Obstruksi saluran cerna

Obstruksi saluran cerna pada bayi baru lahir disebabkan oleh kondisi yang bermacam-macam, seperti stenosis dan atresia usus, malrotasi, ileus meconium, syndrome *meconium plug*, *Hirschprung's disease*, neoplasia, trauma serta penyebab lainnya yang lebih jarang ditemukan (Hajivaissilou, 2003). Presentasi klinis obstruksi saluran cerna pada bayi baru lahir dapat akut dengan gejala nampak jelas (muntah, kebanyakan bercampur empedu), nyeri kolik dengan/tanpa tanda peritonismus maupun perforasi, dan hingga gejala sistemik berat akibat shock. Presentasi klinis pun biasa nampak lebih samar dengan perjalanan klinis kronik pada kasus dengan obstruksi yang inkomplit. (Hajivaissilou, 2013) Bayi dengan permasalahan saluran cerna yang berat cenderung mengalami komplikasi infeksi, intake nutrisi kurang, gangguan pertumbuhan, dan peningkatan durasi perawatan di rumah sakit. Di samping itu, apabila presentasi klinis sulit untuk dikenali, pada bayi baru lahir perburukan dapat cepat terkait dampak pada morbiditas dan mortalitas. Kebanyakan manajemen defeinitif dari obstruksi saluran cerna adalah tindakan koreksi operatif. (Hajivaissilou, 2013)

2.2 Nutrisi Enteral

Pemberian nutrisi enteral dapat menyebabkan peningkatan resiko *necrotizing enterocolitis* (NEC) hingga seringkali awal memulai pemberian pada bayi baru lahir ditunda. Sistem saluran ceran pada bayi baru lahir terutama dengan berat lahir rendah cenderung masih immature dan seringkali memerlukan suatu proses adaptasi sebelum dapat menerima nutrisi full enteral. Minimal enteral feeding (MEF) saat ini diterapkan sebagai strategi untuk meningkatkan toleransi nutrisi dan mencegah komplikasi *gut atrophy* yang akan memperpanjang durasi nutrisi parenteral. MEF diprediksi berpengaruh pada luaran klinis pada bayi preterm ditinjau dari parameter toleransi nutrisi dan indeks pertumbuhan. Namun demikian, suatu penelitian menunjukkan bahwa MEF tidak memiliki efek signifikan dalam mengurangi permeabilitas usus pada

bayi preterm dengan retardasi pertumbuhan intrauterine. (Elburg. Et. Al., 2004; Neu et. Al., 1997).

3.3 Asam Amino Glutamin

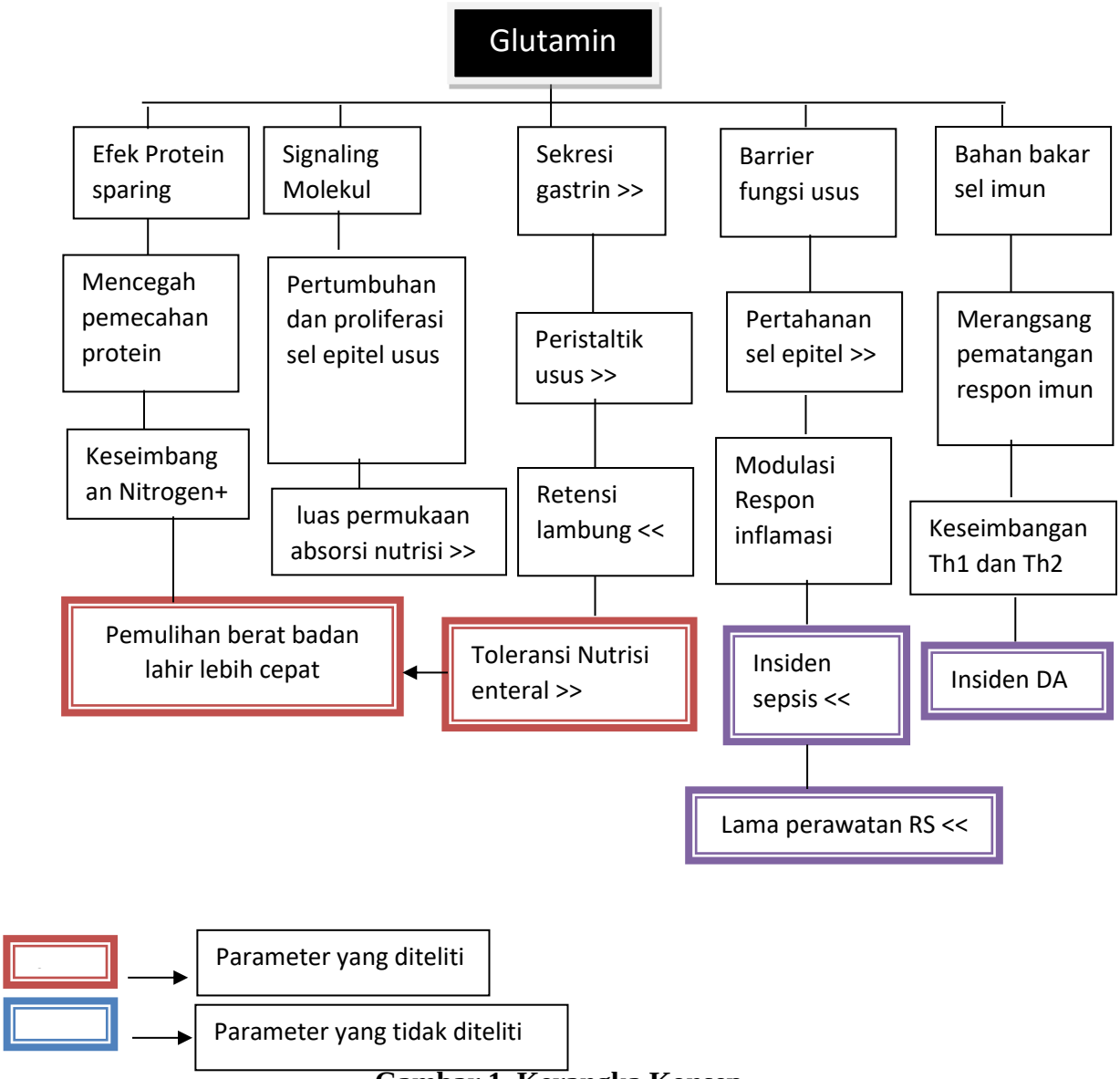
Ada 13 asam amino yang diperlukan bagi manusia yaitu arginine, cysteine, glutamine, histidin, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, tyrosine, dan valine (Eagle, 1995). Salah satu diantara asam amino, yakni glutamin yang dominan terdapat di dalam darah dan cairan intravascular adalah suatu "bahan bakar" metabolic utama bagi kerja system saluran cerna pada mammalia, termasuk manusia. Glutamine berperanan penting bagi bayi dengan *critical-illness* juga kondisi malnutrisi dan bahkan glutamin merupakan komponen nutrisi yang penting untuk menjaga keutuhan integritas mukosa saluran cerna, dan untuk pertumbuhan sel diperlukan sebanyak 1 – 2 milimolar. Namun, seringkali glutamin tersebut hanya tersedia dalam jumlah kecil melalui rute enteral ketika asupan nutrisi relative rendah (eagle, 1995; Chang et. al., 2000; Neu et. al., 1997) Adapun, defisiensi dari asam amino glutamin didapatkan juga berdampak pada system kekebalan tubuh. Bakteri yang berkolonisasi di usus sebagai flora (pada umumnya Escheria coli juga memiliki peranan dalam menghidrolisis glutamine dengan mensekresi enzyme asparaginase. Defisiensi asam amino glutamine ditemukan memiliki efek spesifik pada sistem kekebalan tubuh dengan efek supresi system imun. (Kafkewitz et.al., 1983) Glutamin juga memiliki manfaat, antara lain dikaitkan dengan insidensi sepsis nosokomial yang lebih rendah oleh karena translokasi di mukosa usus yang cenderung berkurang (Neu et.al.,1997)

3.4. Supplementasi Glutamin pada Obstruksi Saluran Cerna

Pada permasalahan seperti suatu obstruksi saluran cerna, akan terjadi distensi segmen usus disertai peningkatan tekanan intraluminal yang berkepanjangan akibat akumulasi cairan intralumen usus. Namun, pada suatu penelitian yang menguji peranan asam amino glutamin dan arginine, didapatkan bahwa pada kelompok kontrol yang diberikan supplementasi dengan glutamin terjadi pengurangan relatif volume cairan yang terakumulasi di intralumen usus dan karenanya juga diduga relatif mengurangi

progresivitas distensi segmen usus yang terobstruksi dibandingkan supplementasi arginine. (Chang, 2001) Toleransi nutrisi enteral yang lebih besar pada bayi memperoleh supplementasi glutamine berhubungan dengan akselerasi perkembangan serta perbaikan metabolisme saluran cerna dikarenakan berkurangnya infeksi (Neu et. al, 1997). Namun demikian, data penelitian diperoleh dari studi *randomized control trial* saat ini masih belum cukup untuk menentukan dengan pasti apakah memang glutamin memiliki manfaat yang signifikan pada bayi dengan permasalahn gastrointestinal. (Wagner, et. al., 2012)

3.5. Kerangka Konsep



Gambar 1. Kerangka Konsep

BAB 3
TUJUAN DAN MANFAAT PENELITIAN

3.1 Tujuan Penelitian

Tujuan dalam penelitian ini adalah untuk menilai manfaat supplementasi pada bayi yang telah usai menjalani operasi akibat sumbatan pada saluran cerna bagian bawah, dengan mengacu pada kenaikan parameter pertambahan berat badan dan kecepatan pencapaian *full enteral feeding*

3.2 Manfaat Penelitian

Mengetahui manfaat pemberian suplemen glutamin sebagai dukungan nutrisi pada bayi paska bedah obstruksi saluran cerna untuk kemudian diharapkan dapat menjadi suatu dasar penyusunan protokol penambahan suplementasi glutamin dalam inisiasi nutrisi rute enteral.

Selain itu, penelitian ini ditargetkan untuk dapat dipublikasikan dalam jurnal ilmiah internasional bereputasi terindeks Scopus.

BAB 4
METODE PENELITIAN

4.1 Jenis atau Rancangan Penelitian

Jenis penelitian eksperimental. Penelitian ini merupakan uji klinik untuk membuktikan peran glutamin enteral nutrisi pada bayi dengan obstruksi cerna bagian bawah pasca operasi. Parameter keluaran yang dinilai adalah dalam hal kecepatan toleransi nutrisi enteral dan pemulihan berat badan.

4.2 Populasi, besar sampel, dan teknik pengambilan sampel

Penelitian ini melakukan uji klinik kepada *human subject*, yakni bayi dengan paska operasi obstruksi saluran cerna yang dirawat di RSUD dr. Soetomo terhitung sejak Maret 2020 dengan besaran sampel ditargetkan total sebanyak 20 sampel. Pemenuhan sampel dilakukan dengan teknik *consecutive sampling*. Perubahan sampling ditempuh oleh dengan memerhatikan kesulitan dalam memperoleh subyek yang layak berdasarkan kriteria inklusi.

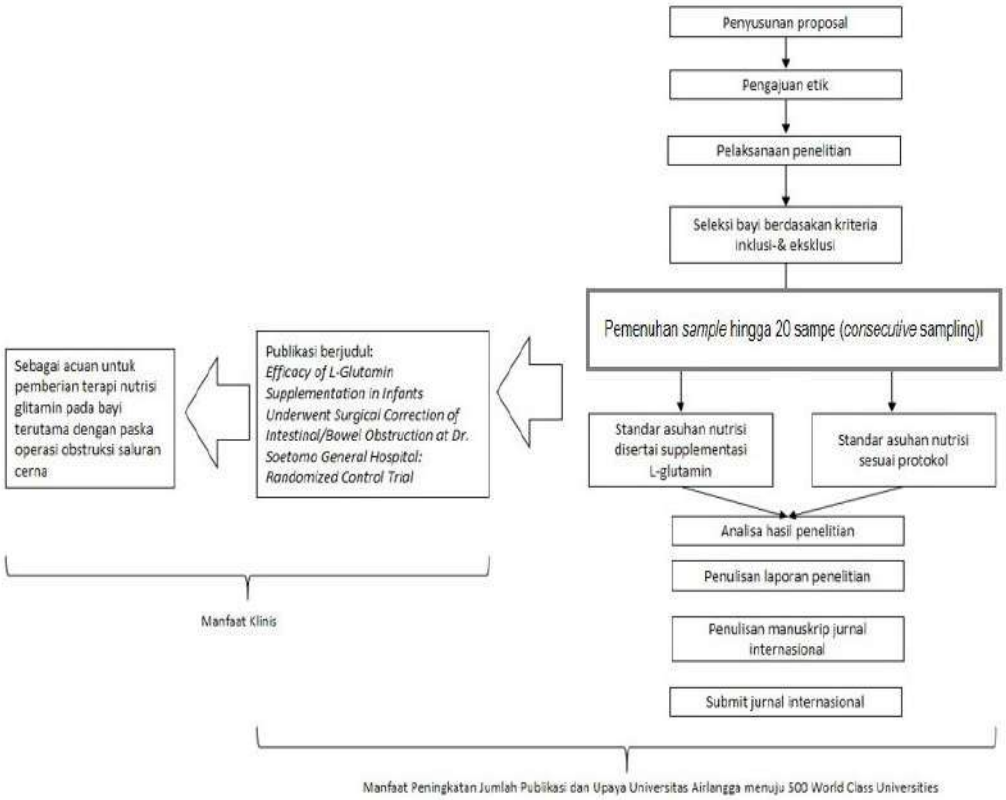
4.3 Teknik pengambilan data

Bayi dengan gangguan obstruksi saluran cerna pasca operasi akan dibagi oleh farmasi menjadi kelompok intervensi dan kelompok kontrol dimana kedua kelompok tersebut akan mendapat L-Glutamin dan placebo L-Glutamin. Bayi kelompok intervensi akan mendapat standar nutrisi sesuai protokol RSUD Dr. Soetomo dengan supplementasi glutamin ketika sudah dapat dimulai nutrisi enteral dengan dosis 400mg/kgbb/hr terbagi berdasarkan frekuensi minum bayi dan kelompok kontrol yang hanya mendapat standar asuhan nutrisi RSUD Dr. Soetomo. Total sampel berjumlah 20 bayi. Sebelum dioperasi, bayi akan ditimbang dan dilakukan penimbangan berat badan setap hari sampai telah tercapai *full-enteral feeding*. Pada saat bayi sudah mendapat enteral feeding, akan diberkan supplementasi L-Glutamin dengan dosis terbagi sampai *full-enteral feeding* 120cc/kgBB.

Data dikumpulkan melalui Lembar Pengumpulan Data (LPD), kemudian direkap pada Microsoft Excel dan dianalisis menggunaka IBM SPSS Statistic 21. Data yang sudah terkumpul dianalisis secara deskritif dengan menggunakan Microsoft Excel

dan IBM SPSS Statistic 21. Data akan dianalisis dengan T-test, chi-square test, dan box-plot untuk melihat perbandingan variabel tergantung antara kelompok terintervensi dan kelompok placebo.

4.4 Bagan Alur Penelitian



Gambar 2. Bagan Alur Penelitian

BAB 5
HASIL PENELITIAN

5.1. Hasil

Dari total 20 bayi, terdapat masing-masing 10 bayi dari kleompok intervensi (diberikan glutamine) dan control. Karakteristik bayi berdasarkan jenis kelamin adalah laki-laki 18 bayi dan peempuan 2 bayi. Dilaporkan ada 12 bayi lahir pervaginam dan 2 bayi lainnya lahir via seksio cesarean. Untuk penegakan diagnosis anomali kongenital, 2 bayi ditegakkan dengan *antenatal testing* sedangkan 18 sisanya ditegakkan paska lahir. Malformasi anorektal disertai fistula ditemukan pada 10 bayi, obstruksi duodenal pada 3 bayi, dan malformasi anorektal disertai fistula rektouretal sebanyak 2 bayi. Sisanya terdapat kelainan lain berupa malformasi anorektal disertai fistula perineal, down syndrome, *duodenal web*, dan obstruksi *gaster outlet*. Pada keseluruhan populasi bayi, (mean ± SD) dari skor APGAR adalah (7.95 ± 0.76). Umunya bayi lahir cukup bulan (38.35 ± 0.87) minggu dengan berat lahir normal, yakni (2885 ± 456,85) gram.

Selanjutnya, dilakukan analsia statistik uji-t untuk menilai perbandingan berat lahir sebelum dan sesudah pemberian suplementasi glutamine dan placebo. Pada kelompok intervensi yang diberikan suplementasi glutamine, dengan 2858.70 $\pm$ 372.03 gram sebelum suplementasi dan ditemukan terdapat kenaikan signifikan menjadi 2949.80 $\pm$ 449.45 gram, nilai p = 0.027. Meskipun demikian, pada kelompok placebo, ditemukan juga peningkatan berat badan yang bermakna dari 2915.90 $\pm$ 437.99 gram menjadi 3028.10 $\pm$ 468.43 gram, nilai p < 0.01. Untuk menilai *Hazard Ratio* (HR (95 % CI)) dari suplementasi glutamine dibandingkan placebo terhadap *full-enteral feeding*, didapatkan nilai 1.157 (0.47, 2.85), menunjukkan tidak adanya resiko suplementasi glutamine terhadap penundaan *full-enteral feeding* meskipun tidak signifikan (nilai p = 0.75).

Table 1. Karakteristik populasi studi

	n/ Mean	(%) / SD
Intervention	10	50
Control	10	50
Sex		
Male	18	90
Female	2	10
Delivery option		
Vaginal Birth	12	60
Caesarean Section	8	40
Diagnostic Establishment Period		
Antenatal	2	10
Postnatal	18	90
Diagnosis		
Anoractal Malformation w/ fistle	10	50
Anorectal Malformation + Perineal Fistle	1	5
Anorectal Malformation + RU fistle	2	10
Down Syndrome + Anorectal Malformation + RU Fistle	1	5
Down Syndrome + Duodenal Obstruction + MAR W/ Fistle	1	5
Duodenal obstruction	3	15
Duodenal Web	1	5
Gastric Outlet Obstruction	1	5
APGAR Score in 5th minute	7.95	0.76
Gestasional Age (Weeks)	38.35	0.87
Body Weight (gram)	2885	456.85

Table 2. Perbandingan Berat Badan terhadap kelompok intervensi pada Pre dan Post Ipemberian glutamine dibandingkan placebo.

	Birth Weight (g) [before intervention]	Birth Weight (g) [after intervention]	*p value*
Glutamine Supplementation	2858.70 $\pm$ 372.03	2949.80 $\pm$ 449.45	0.027*
Placebo Supplementation	2915.90 $\pm$ 437.99	3028.10 $\pm$ 468.43	0.000*
Comparison			0.70**

Table 3. Perbandingan waktu memulai *Full-enteral Feeding* pada kelompok intervensi dan kontrol

	Glutamine	Placebo	HR (95%CI)	*p value*
Time to FEF (days)	6.5 (3-10)	6 (4-12)	1.157 (0.47, 2.85)	0.75

(Hazard Risk = 1, no significant association between glutamine-enriched nutrition with median time to FEF)

BAB 6
RENCANA TAHAPAN BERIKUTNYA

Akan dilakukan submit artikel ilmiah pada jurnal internasional bereputasi untul mengkomunikasikan hasil temuan penelitian ini. Namun, pengerjaan untuk submit artikel sementara masih sedang proses penyusunan manuskrip.

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LAMPIRAN

Lampiran 1. Jadwal Penelitian

Perencanaan dan Desain Penelitian dimulai Januari 2018

No	Tugas	Bulan Pelaksanaan											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Koordinasi Tim Peneliti	√											
2	Membuat rencana penelitian	√											
3	Membuat Proses Penelitian	√											
4	Pengurusan Etik	√	√	√									√
5	Pengambilan dan pengumpulan data				√	√	√	√	√	√	√	√	√
6	Analisis Data												
7	Penulisan Laporan												
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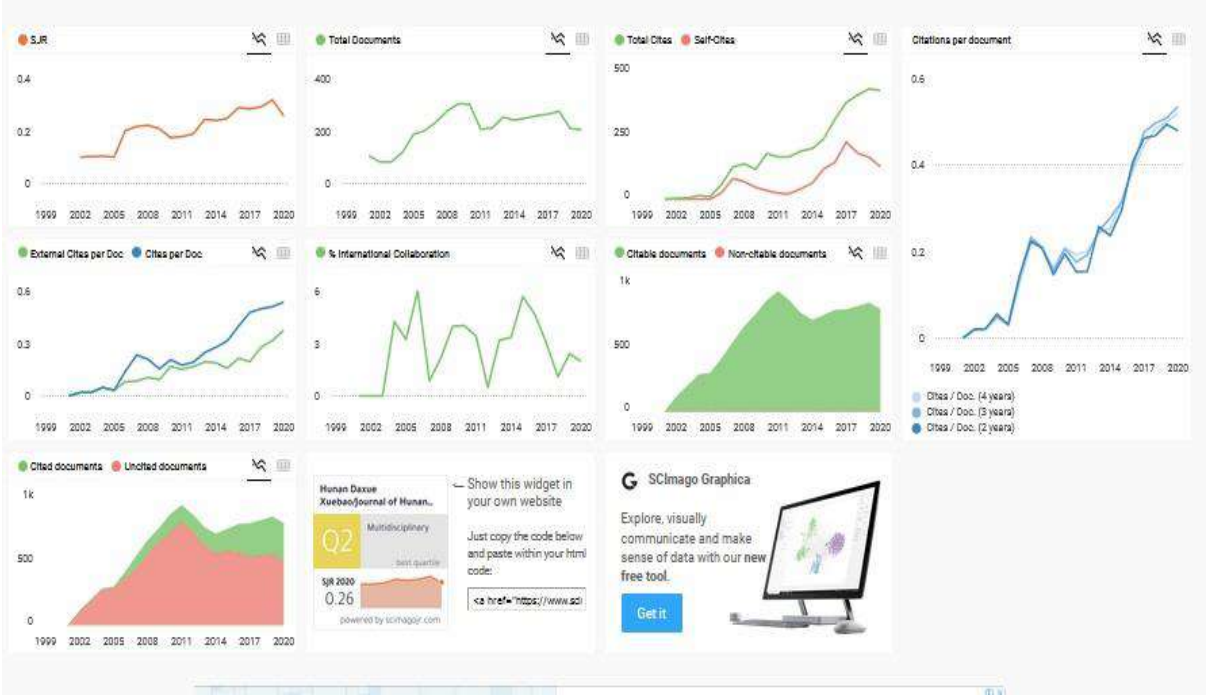

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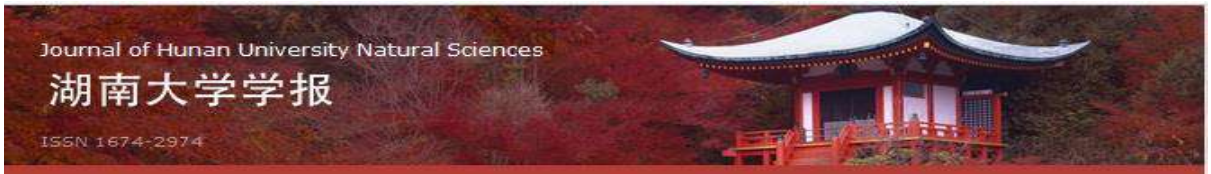

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Effect of Glutamine Enteral Supplementation in Post-Operative Intestinal Obstruction Neonates: A Randomized Control Trial

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Abstract: Surgical treatments targeted for infants suffering congenital intestinal obstruction are advantageous to increase clinical outcomes. However, the post-surgical period might encourage them to depletion of glutamine (Gln). This study aims to evaluate the efficacy of Gln to supply feeding requirements for infants during post-gastrointestinal tract surgical recovery. It was conducted in infants with congenital anomalies involving gastrointestinal (GI) and undergoing surgery using a double-blind, randomized trial design. The population was divided into control and trial groups. Afterward, the comparison of outcomes following the intervention is analyzed to determine the benefits of Gln supplementation. Eighteen of 20 infants were diagnosed with a congenital malformation that involved the GI tract after birth. As reported in 10 infants, anorectal malformation accounted for most of the types of malformations. There was no significant difference in clinical outcomes shown by infants supplied with Gln enteral diet and those who were not, in their birth weight and median time to full-enteral feeding (FEF). Enteral nutrition support using Gln enriched diet does not improve feeding tolerance for infants with congenital GI anomalies during post-surgical care. Concerning the novelty, this study found that the effect of Gln supplementation on babies undergoing GI surgical management is not significantly different from placebo.

Keywords: birth weight, infants, full enteral feeding, glutamine, placebo.

谷氨酰胺腸內補充劑對術後腸梗阻新生兒的影響：一項隨機對照試驗

摘要：針對先天性腸梗阻嬰兒的手術治療有利於提高臨床結果。然而，手術後時期可能會促使他們消耗谷氨酰胺。本研究旨在評估谷氨酰胺在胃腸道手術後恢復期間為嬰兒提供餵養需求的功效。它是在患有涉及胃腸道的先天性異常並使用雙盲、隨機試驗設計接受手術的嬰兒中進行的。人群被分為對照組和試驗組。然後，分析干預後結果的比較，以確定補充谷氨酰胺的益處。二十名嬰兒中有十八名被診斷出患有出生後涉及胃腸道的先天性畸形。據報導，在十名嬰兒中，肛門直腸畸形佔大多數畸形類型。接受谷氨酰胺腸內飲食的嬰兒與未接受谷氨酰胺的嬰兒的出生體重和全腸內餵養的中位時間在臨床結果上沒有顯著差異。在術後護理期間，使用富含谷氨酰胺的飲食進行腸內營養支持不會提高先天性胃腸道異常嬰兒的餵

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養耐受性。關於新穎性，本研究發現補充谷氨酰胺對接受胃腸道手術治療的嬰兒的影響與安慰劑沒有顯著差異。

关键词：出生體重、嬰兒、全腸內餵養、谷氨酰胺、安慰劑。

1. Introduction

Neonatal intestinal obstruction, caused by a mechanical impediment in digestive tract anatomical structures, may impinge on the intestinal motility and present pertinent clinical presentations, namely recurrent bilious vomiting, subtle abdominal distention, and inability to excrete meconium on the first day of life [1]. The latter are subject to the anatomical site of obstruction and the blockage degree [2]. Congenital intestinal obstruction serves as a common surgical emergency in newborn infants [3]. Of all obstruction types, anorectal malformation, esophageal obstruction, and duodenal obstruction become the most prevalent [3, 4].

The supplementation of Glutamine (Gln) is assumed to benefit intestinal mucosal protection and promote the immune system [5, 6]. Moreover, on account of the endogenous synthesis of Gln that may not suffice to meet the increased demand in critically ill patients, Gln could be taken into account as an essential amino acid [7]. Nonetheless, a report from an animal study has shown that oral GLN could not forestall bacterial translocation in rats with intestinal obstruction in which *the Escherichia coli* challenge was in place. Furthermore, there was no specific organ protected by Gln supplementation [8]. Therefore, this randomized control trial study aims to investigate the effect of Gln-supplemented enteral nutrition on feeding tolerance and weight gain in infants with mechanical intestinal obstruction who have undergone surgical procedures.

2. Materials and Methods

With a double-blind, randomized trial design, this experimental study was carried out between May 2020 and January 2021 in the Neonatal Intensive Care Unit (NICU) at Dr. Soetomo General Hospital Surabaya. This study enrolled a sample that comprised infants with mechanical intestinal obstruction who had received surgical procedures at Dr. Soetomo General Hospital based on eligibility criteria. The inclusion criteria applied in this study were infants whose body weight was more than 2000 grams, gestational age of more than 35 weeks, and those with consent approval by the guardians. The exclusion criteria were infants with multiple congenital abnormalities, infants with coexisting sepsis, and those with complications following surgical procedures. Meanwhile, the dropout criteria of this study were infants who presented feeding intolerance, infants whose guardians withdrew their consent, or infants who died during the study period. The sample size of this study was determined using quota sampling, which was to recruit ten samples each for the respective group. The subjects were divided into two groups, the trial group and the control group. The trial group received breast milk supplemented with capsules containing Gln with a dose of 400 mg/kg/day from the initial day of enteral feeding tolerance to the day on which full-enteral feeding had been reached.

On the other hand, the control group received breast milk supplemented with placebo capsules containing 400 mg/kg/day of glucose from the initial day of administering enteral feeding to the day the infants had developed full-feeding tolerance. Weight accretion was observed in each enrolled infant during the administration of either Gln supplemented capsule or placebo capsule. Daily body weight measurements were performed in recruited infants since obtaining approval from the guardians until the enrolled infants had culminated in full-enteral feeding tolerance. Before the study conduction, ethical approval was gained from the Ethics Committee of Dr. Soetomo General Hospital (Ethics Committee Approval Number: 1888/KEPK/III/2020), which complied with the principles of Helsinki.

The guardians gave their informed consent ahead of their inclusion in the study. Before signing the informed consent form, information on informed consent was given. In this study, the SPSS version 21 program for Windows IBM., Corp., Armonk, NY, USA) was used to analyze the data. At first, the analysis of subjects' characteristics was determined by Chi-square, Mann-Whitney, and Fisher Exact test. Then, to assess the normality of the samples, we ran Shapiro-Wilk.

Regarding the analysis aiming to compare the babies' birth weight before and after the administration of placebo and glutamine, we conducted one way ANOVA test and compared means commands. Meanwhile, the control group, babies given a placebo, was also evaluated for their birth weight during pre and post administration of the placebo. The independent-test command was used to compare babies' birth weights from both placebo and control groups. The p-value must be less than 0.05 to determine the significant increase of BW in both groups.

Furthermore, the median time needed for full enteral feeding was compared in both groups by using cox

regression analysis. If the p-value is less than 0.05, the difference will be considered significant.

3. Results and Discussion

As shown in Table 1 that indicates the subjects' characteristics, the intervention and control groups consist of 10 subjects per group. Of the 20 subjects recruited in this study, almost all babies were male (90%). There were eight babies born via cesarean section. From the total population, two babies were identified with anomalies during the antenatal diagnosis procedure, while the other 18 babies had anomalies diagnosed after birth. Concerning the types of anomalies found, suffered by 12 of 20 babies, the most common congenital disorder was anorectal malformation with rectourethral fistula. Another common congenital anomaly, namely duodenal obstruction, was also reported in three babies. Collectively, subjects in this study were born at term (Mean = 38.35 weeks of gestational age), with excellent APGAR score (Mean = 7.95), and had normal birthweight (Mean = 2885 grams). Infants receiving Gln enriched diet were initiating and attaining the supplementation at a younger age than infants from the placebo group.

Table 1 Baseline characteristics

Parameters	**n/Mean**	**(%)/ SD**
Intervention	10	50
Control	10	50
Sex		
Male	18	90
Female	2	10
Delivery		
Vaginal Birth	12	60
Cesarean Section	8	40
Diagnostic Establishment Period		
Anorectal Malformation without Firstly	10	50
Anorectal Malformation with Perineal Firstly	1	5
Anorectal Malformation with Rectourinary (RU) Firstly	2	10
Down Syndrome + Anorectal Malformation + RU Firstly	1	5
Down Syndrome + Duodenal Obstruction	1	5
Duodenal obstruction	3	15
Duodenal Web	1	5
Gastric Outlet Obstruction	1	5
APGAR Score in 5th minute	7.95	0.76
Gestational Age (Weeks)	38.35	0.87
Body Weight (gram)	2885	456.85
Age when initiating enteral Gln (days)		
Intervention group	8	7.26
Placebo group	15	21.6
Age when attaining (days)		
Intervention group	14	7.83
Placebo group	21.6	13.14

Before starting the bivariate model analysis to compare the birthweight of babies during pre and post-interventions of placebo and Gln enriched enteral feeding, the normality of data was evaluated. Throughout the statistical program, the identified variables had been distributed normally (Table 2).

Table 2 Birth weight

	Gln Supplementation	**Placebo Supplementation**	**p-value**
Birth Weight (g) [before intervention]	2858.70 $\pm$ 372.03	2915.90 $\pm$ 437.99	0.84
Birth Weight (g) [after intervention]	2949.80 $\pm$ 449.45	3028.10 $\pm$ 468.43	0.86

Table 3 Full-enteral feeding (hazard risk = 1, no significant association between Gln-enriched nutrition with median time to FEF)

	Gln	**Placebo**	**HR (95%CI)**	**p-value**
Time to FEF (days)	6.5 (3-10)	6 (4-12)	1.157 (0.47, 2.85)	0.75

Then, the statistical program that would be used to further analyze the differences in birth weight was paired t-test. On both groups of control and intervention, according to Table 3, it was found that there were no significant differences in babies' birth weight before administering the placebo and glutamine (p-value = 0.84), nor the birth weight changes after being given both placebo and glutamine (p-value = 0.86), respectively. Another comparison to evaluate the differences of birth weight increase in both intervention and control groups by performing an independent t-test resulted in the higher birth weight significantly seen in the control group. Meanwhile, concerning the median time required to obtain full-enteral feeding, the intervention group needed a shorter period (SD = 3-10 days) than the control group (SD = 4-12 days). However, the difference was not significant (p-value = 0.75).

Our previous study on Indonesian infants with low birth weight had reported the efficacy of enteral Gln supplementation to accelerate birth weight increase velocity, encouraging return to optimum birth weight [9]. We intend to use Gln enteral nutrition to promote better clinical outcomes showed by infants undergoing post-surgical care through this study. After that, Gln depletion elevation is induced by the limitation of intestinal reserves and fasting period during surgical actions. In consequence, Gln synthesis cannot exceed consumption and lead to the high demands of Gln supplementary [10]. Nonetheless, this study revealed no significant benefit of the Gln enteral diet in increasing the birth weight of infants with surgical GI diseases. Even the group of infants not given a Gln enriched diet t experienced the same increase in their birth weight as the control group instead. There are still plenty of previous studies that addressed the efficacy of a Gln enriched diet on infants with GI tract problems

before and after surgery. Gln supplementation unexpectedly turns out to be more beneficial in children and teenagers with short bowel syndrome following intestinal resection or dysfunction. A study in China on children suffering from short bowel syndrome found that the exogenous treatment using Gln and growth hormone supplementation could improve the growth parameters of patients aged 2 to 17 years old, indicated by the increase in participants' body weights [11]. Moreover, another meta-analysis performed to determine the benefits of Gln supplementation for adult patients following surgery due to GI cancer provided evidence that Gln enteral supplementation may benefit patients by reducing the infection rate and length of hospital stay [10]. In addition, a control trial study implies that Gln supplementation is effective in shortening the length of hospital stay for adult patients undergoing gastrointestinal surgery [12].

Our study also did not find any benefit of nutritional support using the Gln diet to shorten the period needed to start enteral feeding. Then, this finding supports a study done by Ong et al. [13] that showed no significant difference in the amount of time to first and full enteral feeding witnessed in participants consist of post GI surgical infants aged less than three years old [13]. Also, similar results of a randomized clinical trial in the Netherlands had reported no increase in time to full enteral feeding, nor improving the feeding tolerance in very low birth weight infants after administering Gln-enriched enteral nutrition [14]. In contrast to our findings, Vaughn et al. [15] and Neu et al. [16], examining enteral Gln supplementation, reported the benefits of Gln supplementation could induce a better tolerance to enteral feedings, decreasing the number of days of restraining full enteral feeding. However, these two studies not directly reported the time to reach full enteral feeding. The failures of achieving full enteral feeding were associated with gestational age < 32 weeks, low birth weight, and male sex [15].

4. Conclusion

To infer, this study of Gln supplementation in babies with congenital GI diseases after the surgical management utterly address the insignificant of Gln supplementation, indicating that there are no significant differences in both control and trial groups.. the main limitation of this study was the variation of infants' age in receiving Gln initiation and attaining full enteral feeding, due to the urgency of performing elective surgeries, infants' age while receiving surgical management, pre-surgical condition, post-surgical fasting period, and the time needed to achieve full enteral feeding. Besides, the number of eligible patients recruited for this study was scarce, and the time to include the patients was also limited. The authors' perspective of this study is that a similar study should be done longer to observe the effect of Gln supplementation during post-surgical conditions while recruiting more patients to be included in the study.

Post-surgical care may cause the feeding tolerance of young babies because of the limitation of intestinal reserves and fasting periods when surgery was performed. Nutritional support is needed to improve the feeding tolerance, thus enabling infants to return to the targeted birth weight range and start enteral feeding earlier. However, the Gln supplementation cannot yet be proved to benefit nutritional support patients with this condition.

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Effect of Glutamine Enteral Supplementation in Post-Operative Intestinal Obstruction Neonates: A Randomized Control Trial

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Abstract: Surgical treatments targeted for infants suffering congenital intestinal obstruction are advantageous to increase clinical outcomes. However, the post-surgical period might encourage them to depletion of glutamine (Gln). This study aims to evaluate the efficacy of Gln to supply feeding requirements for infants during post-gastrointestinal tract surgical recovery. It was conducted in infants with congenital anomalies involving gastrointestinal (GI) and undergoing surgery using a double-blind, randomized trial design. The population was divided into control and trial groups. Afterward, the comparison of outcomes following the intervention is analyzed to determine the benefits of Gln supplementation. Eighteen of 20 infants were diagnosed with a congenital malformation that involved the GI tract after birth. As reported in 10 infants, anorectal malformation accounted for most of the types of malformations. There was no significant difference in clinical outcomes shown by infants supplied with Gln enteral diet and those who were not, in their birth weight and median time to full-enteral feeding (FEF). Enteral nutrition support using Gln enriched diet does not improve feeding tolerance for infants with congenital GI anomalies during post-surgical care. Concerning the novelty, this study found that the effect of Gln supplementation on babies undergoing GI surgical management is not significantly different from placebo.

Keywords: birth weight, infants, full enteral feeding, glutamine, placebo.

1. Introduction

Neonatal intestinal obstruction, caused by a mechanical impediment in digestive tract anatomical structures, may impinge on the intestinal motility and present pertinent clinical presentations, namely recurrent bilious vomiting, subtle abdominal distention, and inability to excrete meconium on the first day of life [1]. The latter are subject to the anatomical site of obstruction and the blockage degree [2]. Congenital intestinal obstruction serves as a common surgical emergency in newborn infants [3]. Of all obstruction types, anorectal malformation, esophageal obstruction, and duodenal obstruction become the most prevalent [3, 4].

The supplementation of Glutamine (Gln) is assumed to benefit intestinal mucosal protection and promote the immune system [5, 6]. Moreover, on account of the endogenous synthesis of Gln that may not suffice to meet the increased demand in critically ill patients, Gln could be taken into account as an essential amino acid [7]. Nonetheless, a report from an animal study has shown that oral GLN could not forestall bacterial translocation in rats with intestinal obstruction in which *the Escherichia coli* challenge was in place. Furthermore, there was no specific organ protected by Gln supplementation [8]. Therefore, this randomized control trial study aims to investigate the effect of Gln-supplemented enteral nutrition on feeding tolerance and weight gain in infants with mechanical intestinal obstruction who have undergone surgical procedures.

2. Materials and Methods

With a double-blind, randomized trial design, this experimental study was carried out between May 2020 and January 2021 in the Neonatal Intensive Care Unit (NICU) at Dr. Soetomo General Hospital Surabaya. This study enrolled a sample that comprised infants with mechanical intestinal obstruction who had received surgical procedures at Dr. Soetomo General Hospital based on eligibility criteria. The inclusion criteria applied in this study were infants whose body weight was more than 2000 grams, gestational age of more than 35 weeks, and those with consent approval by the guardians. The exclusion criteria were infants with multiple congenital abnormalities, infants with coexisting sepsis, and those with complications following surgical procedures. Meanwhile, the dropout criteria of this study were infants who presented feeding intolerance, infants whose guardians withdrew their consent, or infants who died during the study period. The sample size of this study was determined using quota sampling, which was to recruit ten samples each for the respective group. The subjects were divided into two groups, the trial group and the control group. The trial group received breast milk supplemented with capsules containing Gln with a dose of 400 mg/kg/day from the initial day of enteral feeding tolerance to the day on which full-enteral feeding had been reached.

On the other hand, the control group received breast milk supplemented with placebo capsules containing 400 mg/kg/day of glucose from the initial day of administering enteral feeding to the day the infants had developed full-feeding tolerance. Weight accretion was observed in each enrolled infant during the administration of either Gln supplemented capsule or placebo capsule. Daily body weight measurements were performed in recruited infants since obtaining approval from the guardians until the enrolled infants had culminated in full-enteral feeding tolerance. Before the study conduction, ethical approval was gained from the Ethics Committee of Dr. Soetomo General Hospital (Ethics Committee Approval Number: 1888/KEPK/III/2020), which complied with the principles of Helsinki.

The guardians gave their informed consent ahead of their inclusion in the study. Before signing the informed consent form, information on informed consent was given. In this study, the SPSS version 21 program for Windows IBM., Corp., Armonk, NY, USA) was used to analyze the data. At first, the analysis of subjects' characteristics was determined by Chi-square, Mann-Whitney, and Fisher Exact test. Then, to assess the normality of the samples, we ran Shapiro-Wilk.

Regarding the analysis aiming to compare the babies' birth weight before and after the administration of placebo and glutamine, we conducted one way ANOVA test and compared means commands. Meanwhile, the control group, babies given a placebo, was also evaluated for their birth weight during pre and post administration of the placebo. The independent-test command was used to compare babies' birth weights from both placebo and control groups. The p-value must be less than 0.05 to determine the significant increase of BW in both groups.

Furthermore, the median time needed for full enteral feeding was compared in both groups by using cox

regression analysis. If the p-value is less than 0.05, the difference will be considered significant.

3. Results and Discussion

As shown in Table 1 that indicates the subjects' characteristics, the intervention and control groups consist of 10 subjects per group. Of the 20 subjects recruited in this study, almost all babies were male (90%). There were eight babies born via cesarean section. From the total population, two babies were identified with anomalies during the antenatal diagnosis procedure, while the other 18 babies had anomalies diagnosed after birth. Concerning the types of anomalies found, suffered by 12 of 20 babies, the most common congenital disorder was anorectal malformation with rectourethral fistula. Another common congenital anomaly, namely duodenal obstruction, was also reported in three babies. Collectively, subjects in this study were born at term (Mean = 38.35 weeks of gestational age), with excellent APGAR score (Mean = 7.95), and had normal birthweight (Mean = 2885 grams). Infants receiving Gln enriched diet were initiating and attaining the supplementation at a younger age than infants from the placebo group.

Table 1 Baseline characteristics

Parameters	n/Mean	(%)/ SD
Intervention	10	50
Control	10	50
Sex		
Male	18	90
Female	2	10
Delivery		
Vaginal Birth	12	60
Cesarean Section	8	40
Diagnostic Establishment Period		
Anorectal Malformation without Firstly	10	50
Anorectal Malformation with Perineal Firstly	1	5
Anorectal Malformation with Rectourinary (RU) Firstly	2	10
Down Syndrome + Anorectal Malformation + RU Firstly	1	5
Down Syndrome + Duodenal Obstruction	1	5
Duodenal obstruction	3	15
Duodenal Web	1	5
Gastric Outlet Obstruction	1	5
APGAR Score in 5th minute	7.95	0.76
Gestational Age (Weeks)	38.35	0.87
Body Weight (gram)	2885	456.85
Age when initiating enteral Gln (days)		
Intervention group	8	7.26
Placebo group	15	21.6
Age when attaining (days)		
Intervention group	14	7.83
Placebo group	21.6	13.14

Before starting the bivariate model analysis to compare the birthweight of babies during pre and post-interventions of placebo and Gln enriched enteral feeding, the normality of data was evaluated. Throughout the statistical program, the identified variables had been distributed normally (Table 2).

Table 2 Birth weight

	Gln Supplementation	Placebo Supplementation	p-value
Birth Weight (g) [before intervention]	2858.70 ± 372.03	2915.90 ± 437.99	0.84
Birth Weight (g) [after intervention]	2949.80 ± 449.45	3028.10 ± 468.43	0.86

Table 3 Full-enteral feeding (hazard risk = 1, no significant association between Gln-enriched nutrition with median time to FEF)

	Gln	Placebo	HR (95% CI)	p-value
Time to FEF (days)	6.5 (3-10)	6 (4-12)	1.157 (0.47, 2.85)	0.75

Then, the statistical program that would be used to further analyze the differences in birth weight was paired t-test. On both groups of control and intervention, according to Table 3, it was found that there were no significant differences in babies' birth weight before administering the placebo and glutamine (p-value = 0.84), nor the birth weight changes after being given both placebo and glutamine (p-value = 0.86), respectively. Another comparison to evaluate the differences of birth weight increase in both intervention and control groups by performing an independent t-test resulted in the higher birth weight significantly seen in the control group. Meanwhile, concerning the median time required to obtain full-enteral feeding, the intervention group needed a shorter period (SD = 3-10 days) than the control group (SD = 4-12 days). However, the difference was not significant (p-value = 0.75).

Our previous study on Indonesian infants with low birth weight had reported the efficacy of enteral Gln supplementation to accelerate birth weight increase velocity, encouraging return to optimum birth weight [9]. We intend to use Gln enteral nutrition to promote better clinical outcomes showed by infants undergoing post-surgical care through this study. After that, Gln depletion elevation is induced by the limitation of intestinal reserves and fasting period during surgical actions. In consequence, Gln synthesis cannot exceed consumption and lead to the high demands of Gln supplementary [10]. Nonetheless, this study revealed no significant benefit of the Gln enteral diet in increasing the birth weight of infants with surgical GI diseases. Even the group of infants not given a Gln enriched diet t experienced the same increase in their birth weight as the control group instead. There are still plenty of previous studies that addressed the efficacy of a Gln enriched diet on infants with GI tract problems

before and after surgery. Gln supplementation unexpectedly turns out to be more beneficial in children and teenagers with short bowel syndrome following intestinal resection or dysfunction. A study in China on children suffering from short bowel syndrome found that the exogenous treatment using Gln and growth hormone supplementation could improve the growth parameters of patients aged 2 to 17 years old, indicated by the increase in participants' body weights
[11]. Moreover, another meta-analysis performed to determine the benefits of Gln supplementation for adult patients following surgery due to GI cancer provided evidence that Gln enteral supplementation may benefit patients by reducing the infection rate and length of hospital stay [10]. In addition, a control trial study implies that Gln supplementation is effective in shortening the length of hospital stay for adult patients undergoing gastrointestinal surgery [12].

Our study also did not find any benefit of nutritional support using the Gln diet to shorten the period needed to start enteral feeding. Then, this finding supports a study done by Ong et al. [13] that showed no significant difference in the amount of time to first and full enteral feeding witnessed in participants consist of post GI surgical infants aged less than three years old
[13]. Also, similar results of a randomized clinical trial in the Netherlands had reported no increase in time to full enteral feeding, nor improving the feeding tolerance in very low birth weight infants after administering Gln-enriched enteral nutrition [14]. In contrast to our findings, Vaughn et al. [15] and Neu et al. [16], examining enteral Gln supplementation, reported the benefits of Gln supplementation could induce a better tolerance to enteral feedings, decreasing the number of days of restraining full enteral feeding. However, these two studies not directly reported the time to reach full enteral feeding. The failures of achieving full enteral feeding were associated with gestational age < 32 weeks, low birth weight, and male sex [15].

4. Conclusion

To infer, this study of Gln supplementation in babies with congenital GI diseases after the surgical management utterly address the insignificant of Gln supplementation, indicating that there are no significant differences in both control and trial groups.. the main limitation of this study was the variation of infants' age in receiving Gln initiation and attaining full enteral feeding, due to the urgency of performing elective surgeries, infants' age while receiving surgical management, pre-surgical condition, post-surgical fasting period, and the time needed to achieve full enteral feeding. Besides, the number of eligible patients recruited for this study was scarce, and the time to include the patients was also limited. The authors' perspective of this study is that a similar study should be done longer to observe the effect of Gln supplementation during post-surgical conditions while recruiting more patients to be included in the study.

Post-surgical care may cause the feeding tolerance of young babies because of the limitation of intestinal reserves and fasting periods when surgery was performed. Nutritional support is needed to improve the feeding tolerance, thus enabling infants to return to the targeted birth weight range and start enteral feeding earlier. However, the Gln supplementation cannot yet be proved to benefit nutritional support patients with this condition.

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