

【平成23年度】研究成果の刊行に関する一覧表（中澤徹）

雑誌

発表者氏名	論文タイトル名	発表誌名	巻号	ページ	出版年
Ryu M, Nakazawa T* , Akagi T, Tanaka T, Watanabe R, Yasuda M, Himori N, Maruyama K, Yamashita T, Abe T, Akashi M, Nishida K.	Suppression of phagocytic cells in retinal disorders using amphiphilic poly(γ -glutamic acid) nanoparticles containing dexamethasone	J Control Release	Apr 10;151(1)	65-73	2011
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Kunikata H, Uematsu M, Nakazawa T , Fuse N.	Successful Removal of Large Intraocular Foreign Body by 25-Gauge Microincision Vitrectomy Surgery.	J Ophthalmol	2011;940323.	Epub 2011 Apr 4.	2011

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発表者氏名	論文タイトル名	発表誌名	巻号	ページ	出版年
Ryu M, Yasuda M, Shi D, Shanab A. Y, Watanabe R, Himori N, Omodaka K, Yokoyama Y, Takano J, Saido T, Nakazawa T* .	The critical role of calpain in axonal damage-induced retinal ganglion cell death.	<i>J Neurosci Res.</i>	Apr;90(4)	802-15	2012
Aizawa N, Nakazawa T* , et al.	Reproducibility of retinal circulation measurements obtained using laser speckle flowgraphy-NAVI in patients with glaucoma.	<i>Clin Ophthalmol.</i>	5	1171-6	2011
Chiba N, Nakazawa T* , et al.	Association between optic nerve blood flow and objective examinations in glaucoma patients with generalized enlargement disc type.	<i>Clin Ophthalmol.</i>	5	1549-56 Epub 2011 Oct 28.	2011
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【平成23年度】研究成果の刊行に関する一覧表（永井展裕）

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H Onami, N Nagai , S Machida, N Kumasaka, R Wakusawa, Y Ishikawa, H Sonoda, Y Sato, T Abe	Reduction of laser-induced choroidal neovascularization by intravitreal vasohibin-1 in monkey eyes	RETINA The Journal of Retinal and Vitreous Diseases	32 (6)	1204-1213	2012
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【平成 23 年度】研究成果の刊行に関する一覧表（西澤松彦）

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【平成24年度】研究成果の刊行に関する一覧表（阿部 俊明）

雑誌

発表者氏名	論文タイトル名	発表誌名	巻号	ページ	出版年
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Ahmed Y Shanab, Toru Nakazawa, Morin Ryuu, Yuji Tanaka, Noriko Himori, Keiko Taguchi, Masayuki Yasuda, Ryo Watanabe, Jiro Takano; Saido Takaomi, Naoko Minegishi; Toshio Miyata, Toshiaki Abe, Masayuki, Yamamoto	Metabolic stress response implicated in diabetic retinopathy: The role of calpain, and the therapeutic impact of calpain inhibitor	Neurobiol Dis	48(3)	556-67	2012 Dec
Hiroshi Kunikata, Masayuki Yasuda, Naoko Aizawa, Yuji Tanaka, Toshiaki Abe, and Toru Nakazawa	Intraocular Concentrations of Cytokines and Chemokines in Rhegmatogenous Retinal Detachment and the Effect of Intravitreal Triamcinolone Acetonide	Am J Ophthalmol	155(6)	1028-1037	2013 Jun;
Aizawa N, Kunikata H, Abe T, Nakazawa T	Efficacy of combined 25-gauge microincision vitrectomy, intraocular lens implantation, and posterior capsulotomy	J Cataract Refract Surg	38(9)	1602-7	2012 Sep
Kobayashi W, Abe T, Tamai H, Nakazawa T.	Choroidal excavation with polypoidal choroidal vasculopathy: a case report.	Clin Ophthalmol	6	1373-6	2012
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Yumi Tokita-Ishikawa, Nobuhiro Nagai, Hideyuki Onami, Norihiro Kumasaka, Hikaru Sonoda, Tomoaki Takakura, Yasufumi Sato, Toshiaki Abe	Vasohibin and retinal pigment epithelium	Adv Exp Med Biol	723	305-310	2012

【平成24年度】研究成果の刊行に関する一覧表（中澤 徹）

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Takahashi H, Sugiyama T, Tokushige H, Maeno T, Nakazawa T, Ikeda T, Araie M	Comparison of CCD-equipped laser speckle flowgraphy with hydrogen gas clearance method in the measurement of optic nerve head microcirculation in rabbits Experimental Eye Research	Exp Eye Res		108	2013
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【平成 24 年度】研究成果の刊行に関する一覧表（植田 弘師）

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Ueda H, Matsunaga H, Halder SK	Prothymosin α plays multifunctional cell robustness roles in genomic, epigenetic, and nongenomic mechanisms	Ann N Y Acad Sci	1269	34-43	2012

【平成24年度】研究成果の刊行に関する一覧表（永井 展裕）

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Yumi Ishikawa, Nobuhiro Nagai, Hideyuki Onami, Norihiro Kumasaka, Ryosuke Wakusawa, Hikaru Sonoda, Yasufumi Sato, Toshiaki Abe	Vasohibin-1 and retinal pigment epithelium	Adv Exp Med Biol	723	305-310	2012

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Ido Y, Takahashi D, Sasaki M, Nagamine K, Miyake T, Jasinski P, Nishizawa M	Conducting Polymer Microelectrodes Anchored to Hydrogel Films	ACS Macro Letters	1	400-403	2012
Haneda K, Yoshino S, Ofuji T, Miyake T, Nishizawa M	Sheet-Shaped Biofuel Cell Constructed from Enzyme-Modified Nanoengineered Carbon Fabric	Electrochim. Acta	82	175-178	2012
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【平成 25 年度】研究成果の刊行に関する一覧表（阿部 俊明）

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Abe T, Tokita-Ishikawa Y, Onami H, Katsukura Y, Kaji H, Nishizawa M, Nagai N	Intrascleral Transplantation of a Collagen Sheet with Cultured Brain-Derived Neurotrophic Factor Expressing Cells Partially Rescues the Retina from Damage due to Acute High Intraocular Pressure. Retinal Degenerative Diseases	Advances in Experimental Medicine and Biology	Volume 801	837-843	2014
Nagai N, Kaji H, Onami H, Ishikawa Y, Nishizawa M, Osumi N, Nakazawa T, Abe T.	A polymeric device for controlled transscleral multi-drug delivery to the posterior segment of the eye	Acta Biomater	10	680-7	2014
Kunikata H, Aizawa N, Meguro Y, <u>Abe T</u> , Nakazawa T.	Combined 25-gauge microincision vitrectomy and toric intraocular lens implantation with posterior capsulotomy.	Ophthalmic Surg Lasers Imaging Retina	44	145-54	2013
Kunikata H, Yasuda M, Aizawa N, Tanaka Y, Abe T, Nakazawa T	Intraocular concentrations of cytokines and chemokines in rhegmatogenous retinal detachment and the effect of intravitreal triamcinolone acetonide	Am J Ophthalmol	155	1028-37	2013

【平成25年度】研究成果の刊行に関する一覧表（中澤 徹）

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Takahashi H, Sugiyama T, Tokushige H, Maeno T, Nakazawa T, Ikeda T, Araie M	Comparison of CCD-equipped laser speckle flowgraphy with hydrogen gas clearance method in the measurement of optic nerve head microcirculation in rabbits	Exp Eye Res	108	10-15	2013
Shiga Y, Shimura M, Asano T, Tsuda S, Yokoyama Y, Aizawa N, Omodaka K, Ryu M, Yokokura S, Takeshita T, Nakazawa T.	The influence of posture change on ocular blood flow in normal subjects, measured by laser speckle flowgraphy	Curr Eye Res	38	691-698	2013
Shi D, Takano Y, Nakazawa T, Mengkegale M, Yokokura S, Nishida K, Fuse N	Molecular genetic analysis of primary open-angle glaucoma, normal tension glaucoma, and developmental glaucoma for the VAV2 and VAV3 gene variants in Japanese subjects	Biochem Biophys Res Commun	432	509-512	2013
Shi D, Funayama T, Mashima Y, Takano Y, Shimizu A, Yamamoto K, Mengkegale M, Miyazawa A, Yasuda N, Fukuchi T, Abe H, Ideta H, Nishida K, Nakazawa T, Richards JE, Fuse N	Association of HK2 and NCK2 with normal tension glaucoma in the Japanese population	PLoS One	8	e54115	2013

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Himori N, Yamamoto K, Maruyama K, Ryu M, Taguchi K, Yamamoto M, Nakazawa T	Critical role of Nrf2 in oxidative stress-induced retinal ganglion cell death.	J Neurochem	127	669-680	2013
Hayashi R, Himori N, Taguchi K, Ishikawa Y, Uesugi K, Ito M, Duncan T, Tsujikawa M, Nakazawa T, Yamamoto M, Nishida K	The role of the Nrf2-mediated defense system in corneal epithelial wound healing	Free Radic Biol Med	61	333-342	2013

別紙4

【平成25年度】研究成果の刊行に関する一覧表（植田 弘師）

雑誌

発表者氏名	論文タイトル名	発表誌名	巻号	ページ	出版年
Halder SK, Matsunaga H, Yamaguchi H, Ueda H	Novel neuroprotective action of prothymosin α -derived peptide against retinal and brain ischemic damages	J Neurochem	125	713-723	2013
Halder SK, Sugimoto J, Matsunaga H, Ueda H	Therapeutic benefits of 9-amino acid peptide derived from prothymosin alpha against ischemic damages	Peptide	43	68-75	2013

別紙 4

【平成 2 5 年度】研究成果の刊行に関する一覧表（永井 展裕）

雑誌

発表者氏名	論文タイトル名	発表誌名	巻号	ページ	出版年
Nagai N , Kaji H, Onami H, Ishikawa Y, Nishizawa M, Osumi N, Nakazawa T, Abe T.	A polymeric device for controlled transscleral multi-drug delivery to the posterior segment of the eye	A c t a Biomateriali a	10	680-687	2014

別紙 4

【平成 2 5 年度】研究成果の刊行に関する一覧表（西澤 松彦）

雑誌

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平成 23 年度

Difficulty in Inserting 25- and 23-Gauge Trocar Cannula during Vitrectomy

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Key Words

Retinal detachment · 25-gauge vitrectomy · 23-gauge vitrectomy · Choroidal detachment · Trocar cannula

Abstract

Purpose: To determine the incidence of difficulty in inserting a 25- and 23-gauge trocar cannula (DITC) during 25- or 23-gauge micro-incision vitrectomy surgery (MIVS). **Methods:** Retrospective, consecutive, interventional case series performed by a single surgeon at a single centre. We defined a DITC as the condition where at least 1 trocar cannula could not be inserted into the vitreous at the beginning of MIVS. The incidence of DITC was calculated from 1,525 eyes, and the pre-operative demographics of the DITC cases were compared to those of the non-DITC cases. **Results:** The incidence of DITC for all cases was 0.6% (9 of 1,525 eyes). Overall, there were 242 eyes with a retinal detachment (RD), and 8 of the 9 eyes with DITC had an RD with an incidence of 3.3% (8 of 242 RD eyes). Seven of these 8 eyes had a total RD, 4 also had a choroidal detachment, 4 eyes were also myopic (>−8.0 dpt, high myopia), and 6 of the 8 eyes were hypotonic (<8 mm Hg). The DITC cases had larger RDs ($p < 0.0001$), a higher incidence of choroidal detachment

($p < 0.0001$), higher myopia ($p = 0.0204$) and hypotony ($p = 0.0003$) than the non-DITC eyes with an RD. **Conclusions:** A large RD, a choroidal detachment, high myopia and hypotony are significant risk factors for DITC. We recommend that MIVS should be performed cautiously for eyes with these risk factors.

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Introduction

Twenty-five- and 23-gauge micro-incision vitrectomy surgery (MIVS) were first reported in 2002 and 2005, respectively. These techniques have become commonly used throughout the world [1–5]. The indications for MIVS for different kinds of vitreoretinal diseases including primary rhegmatogenous retinal detachment (RD) have increased [1, 6, 7].

This paper was partially presented at the Annual Meeting of the Japanese Retina and Vitreous Society, Nagoya, December 2009.

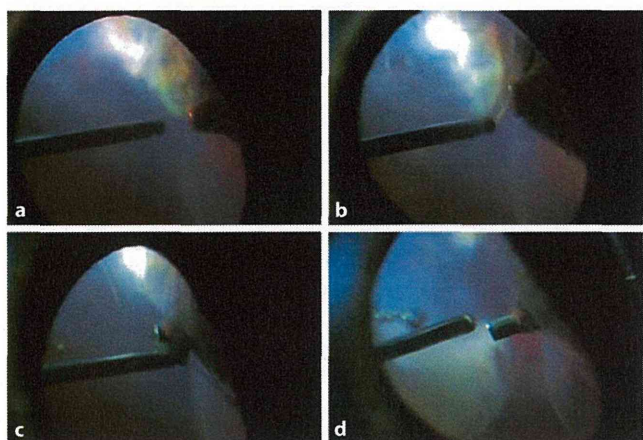
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Fig. 1. Intra-operative photograph of an eye with a rhegmatogenous RD which had DITC, i.e. the trocar cannula could not be inserted into the vitreous during 23-gauge MIVS. **a** The infusion cannula could not be inserted into the vitreous. **b** Vitreous gel is partially leaking into the infusion cannula which is incompletely inserted. **c** The gel was removed with the vitreous cutter, and the pars plana region was gently compressed. **d** The infusion cannula is completely inserted into the vitreous after counter assistance. This technique of counter assistance was performed for DITC.

There are three disadvantages of MIVS. First, there are cases where it is difficult to insert the 23- or 25-gauge microcannula [8]. Second, both the 23- and 25-gauge instruments can be jammed in the cannula by vitreal haemorrhage [9, 10]. And third, the 25-gauge soft-tip needle is unable to completely remove fluid during air-fluid exchange because the needle cannot reach the back of an elongated globe in highly myopic eyes [11]. The second and third problems are relatively easy to overcome from the pre-operative findings, and eyes with these properties can undergo conventional 20-gauge pars plana vitrectomy (PPV).

However, the cause for the difficulty in inserting the trocar cannula (DITC) into the vitreous has not been determined, and determining its cause is difficult because it is encountered only intra-operatively during MIVS but at a very low frequency. At present, it cannot be predicted by the pre-operative demographics which eyes will have DITC.

Thus, the purpose of this study was to determine the incidence of eyes in which DITC is encountered during MIVS, and to determine the pre-operative characteristics of eyes that are associated with this problem.

Patients and Methods

Subjects

We reviewed the medical records of 1,525 consecutive eyes that had undergone PPV with either a 25- or a 23-gauge trocar cannula system (table 1; Alcon Laboratories, Fort Worth, Tex., USA). Only eyes that had undergone MIVS performed by a single surgeon (H.K.) at the Surgical Retina Clinic of the Tohoku University Hospital from May 2006 to November 2009 were included. Eyes that had undergone 20-gauge PPV for complex vitreoretinal disease such as severe proliferative vitreoretinopathy and severe proliferative diabetic retinopathy were excluded.

After the purpose and procedures of the operation had been explained, an informed consent was obtained from all patients. The procedures used conformed to the tenets of the Declaration of Helsinki and this study was approved by the Review Board of the School of Medicine, Tohoku University.

Surgical Procedures

All surgeries were performed under retrobulbar anaesthesia using the oblique sclerotomy technique with the Accurus Vitrectomy System (Alcon Laboratories) [12]. The choice between 25- and 23-gauge MIVS was made by the surgeon (H.K.) based on the clinical findings of the eye. First, an infusion cannula was inserted through the inferotemporal sclera followed by the insertion of 2 cannulas through superotemporal and superonasal sites. The exact surgical procedures varied according to the type of retinal disease.

We defined a DITC as the condition where at least 1 trocar cannula could not be inserted into the vitreous at the beginning of MIVS.

Pre-Operative Measurements in Patients with RD

To determine the pre-operative factors that were associated with an intra-operative DITC, the intra-ocular pressure (IOP), refractive error, size of the RD and the presence of a choroidal detachment were investigated in patients with an RD. The IOP was measured with a non-contact tonometer or a Goldmann applanation tonometer, and the refractive error (diopters) was determined with an autorefractometer (Tonoref RKT-7700 or ARK-700; Nidek). The extent of the RD was graded from 1 to 4 according to the number of quadrants it covered. The presence of a pre-operative choroidal detachment was also recorded.

Technique of Counter Assistance for Eyes with DITC

We define the 'technique of counter assistance' as vitrector-assisted perforation of the pars plana. The vitreal cutter was relatively easy to insert into the vitreous through the superior site because the cutter was much longer than the infusion cannula. However, when the infusion cannula could not be inserted into the vitreous, i.e. in cases of DITC, the insertion was made possible by inserting the cannula using the vitreal cutter from the superior nasal side (fig. 1a). During this procedure, vitreous gel was leaking into the partially inserted infusion cannula (fig. 1b). The extra gel was cut and removed by the vitreous cutter, and the head of the cutter was gently pressed against the pars plana region that had been perforated by the infusion cannula from the outside of the eye (fig. 1c). Then, the infusion cannula was inserted into the vitreous and fixed (fig. 1d). In cases of DITC, we first tried the technique of counter assistance, and next converted to 20-gauge PPV if the technique was not successful.

Table 1. Incidence of DITC in 25- and 23-gauge MIVS

Surgical procedure	Incidence of DITC	Age, years	Disease and number of eyes
25-Gauge MIVS (n = 1,294)	5/1,294 (0.4%) ^a	4–93 (mean 62.6 ± 13.7) ^b	proliferative diabetic retinopathy (237, 18.3%) ^c epiretinal membrane (371, 28.7%) macular hole (153, 11.8%) RD (154, 11.9%) vitreous haemorrhage and opacity (76, 5.9%) proliferative vitreoretinopathy (56, 4.3%) macular oedema (184, 14.2%) ocular perforating injury (7, 0.5%) others (56, 4.3%)
23-Gauge MIVS (n = 231)	4/231 (1.7%) ^a	9–86 (mean 55.9 ± 16.8) ^b	proliferative diabetic retinopathy (55, 23.8%) ^c epiretinal membrane (3, 1.3%) macular hole (17, 7.4%) RD (88, 38.1%) vitreous haemorrhage and opacity (19, 8.2%) proliferative vitreoretinopathy (39, 16.9%) macular oedema (7, 3.0%) ocular perforating injury (1, 0.4%) others (2, 0.9%)

^a p = 0.0346 (Fisher's exact probability test), ^b p < 0.0001 (Mann-Whitney test), ^c p < 0.0001 (χ^2 for independence test), 25- versus 23-gauge.

DITC Score

There were 4 factors that determined the possibility that DITC will be encountered during MIVS in eyes with RD, and eyes were graded by these factors: a total RD (4 quadrants), a choroidal detachment, myopia >–8.0 dpt (high myopia) and hypotony <8 mm Hg. The DITC score ranged from 0 to 4 according to the number of these factors that were present, and the DITC score of each eye was determined.

Statistical Analyses

The significance of the difference in the mean age of the patients who had undergone 25- and 23-gauge MIVS was determined by the Mann-Whitney U test. The significance of the difference in the incidence of DITC for cases that had 25-gauge MIVS and those that had 23-gauge MIVS was determined by Fisher's exact probability test. Non-DITC eyes with an RD which had had all of the data for the 4 factors and were phakic were compared with DITC eyes with RD using statistical packages including Mann-Whitney U test or Fisher's exact probability test. Eyes with dense vitreous haemorrhage or which were pseudophakic were excluded from the analysis to determine the possibility of DITC in eyes with RD because the original refractive error could not be determined. For the analyses of RD, in cases that had surgery on both eyes or had multiple surgeries on one eye, only one eye was used for the statistical analyses.

Results

Incidence of DITC during 25- and 23-Gauge MIVS

The incidence of DITC for all eyes was 0.6% (9 of 1,525 eyes; table 1). The incidence of DITC in eyes undergoing 23-gauge MIVS was 1.7% (4/231) which was significantly higher than the 0.4% (5/1,294) undergoing 25-gauge MIVS (p = 0.0346; Fisher's exact probability test). The mean age of the patients who had 25-gauge MIVS was 62.6 ± 13.7 years which was significantly higher than the 55.9 ± 16.8 years for those who had 23-gauge MIVS (p < 0.0001, Mann-Whitney test). The distribution of the different types of diseases was also statistically different in 25- and 23-gauge MIVS (p < 0.0001, χ^2 for independence test). Eyes with an epiretinal membrane that had 25-gauge MIVS were 22 times more frequent than eyes that had 23-gauge MIVS. For macular oedema, eyes that had 25-gauge MIVS were 4 times more frequent than eyes that had 23-gauge MIVS. Eyes with RD and proliferative vitreoretinopathy that had 23-gauge MIVS were 3 times more frequent than those which underwent 25-gauge MIVS.