

# How To Perform Selective Ophthalmic Arterial Injection

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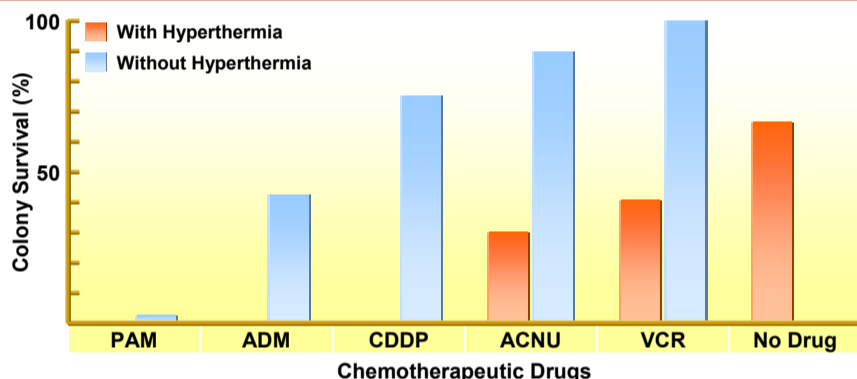
## Background

Since 1996, the primary treatment method of eye-preservation therapy of retinoblastoma has become a systemic chemotherapy using vincristine, etoposide and carboplatin (VEC) in many countries (Ref. 1). However this is a very effective chemoreduction therapy, that is, recurrence is inevitable in more than 90% cases. Therefore additional other treatments are necessary for successful eye-preservation. In addition to that, this treatment cannot be exempted from usual systemic complications common to the systemic chemotherapy of anticancer drugs. Our colleague, Mohri, M. developed a selective ophthalmic arterial injection using a balloon catheter in 1989 to reduce systemic complications of chemotherapy (Ref. 2). Inomata, M. revealed melphalan had the greatest effect on retinoblastoma among the 12 commonly used chemotherapeutic agents using a clonogenic assay (Ref. 3).

## Selective Ophthalmic Arterial Injection (SOAI) developed by Makoto Mohri, MD



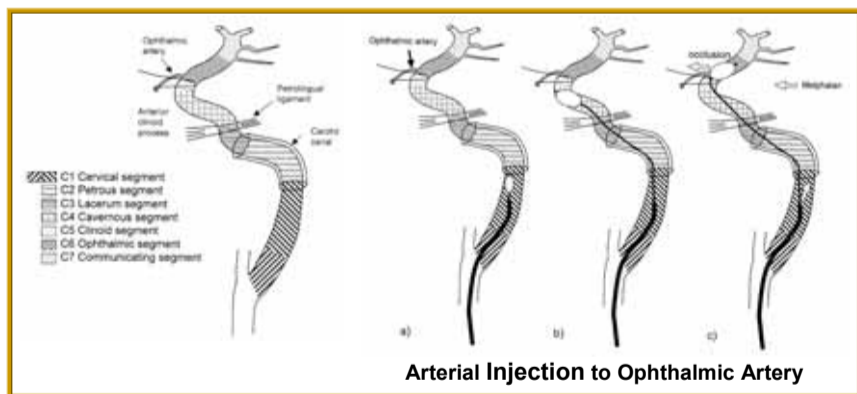
## Sensitivity of 12 Primary Retinoblastoma Cells to Chemotherapeutic Drugs With and Without Hyperthermia (42°C, 1 Hr.)



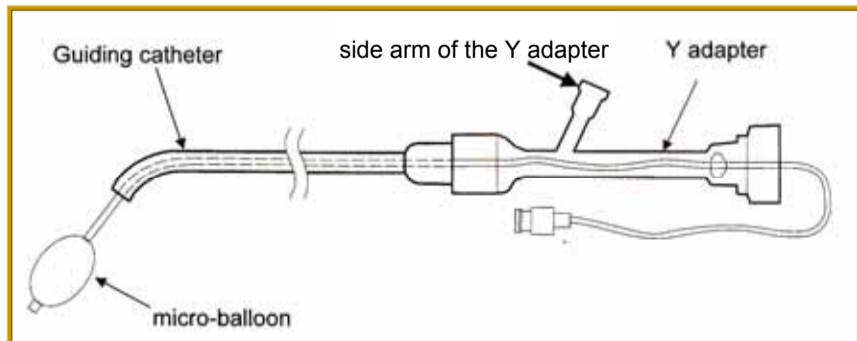
## Details of Selective Ophthalmic Arterial Injection

- ◆ Procedure was performed under general anesthesia
- ◆ Puncture of the inguinal artery with 21G Surflo I. V. Catheter® (Terumo)
- ◆ Insertion of 4-Fr polyethylene simple curved Introducer catheter (Cathex, Tokyo, Japan) attached with a micro-balloon catheter (Kaneka Medix, Osaka, Japan)
- ◆ Advancement of the catheter within the internal carotid artery by Seldinger technique to the proximal end of the orifice of the ophthalmic artery
- ◆ During the temporary occlusion by inflation of the balloon, a spot angiogram was taken and melphalan was infused from the introducer catheter
- ◆ Removal of the catheters and hemostasis by manual pressure
- ◆ Bandage and awakening from the general anesthesia
- ◆ Disinfection of the punctured site for 2 days after the procedure

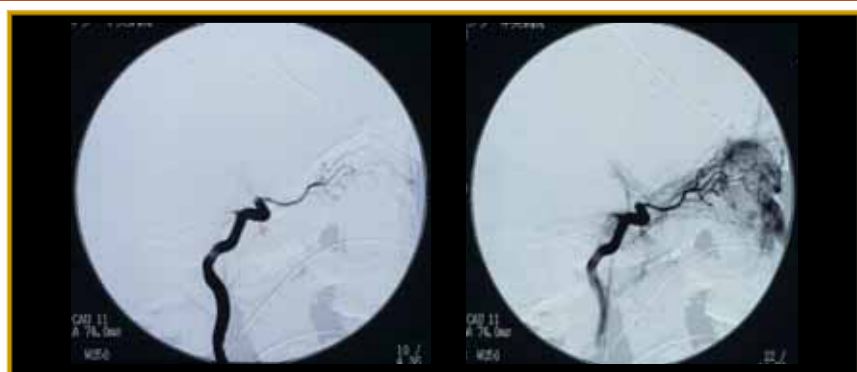
## Segmental Anatomy of Internal Carotid Artery



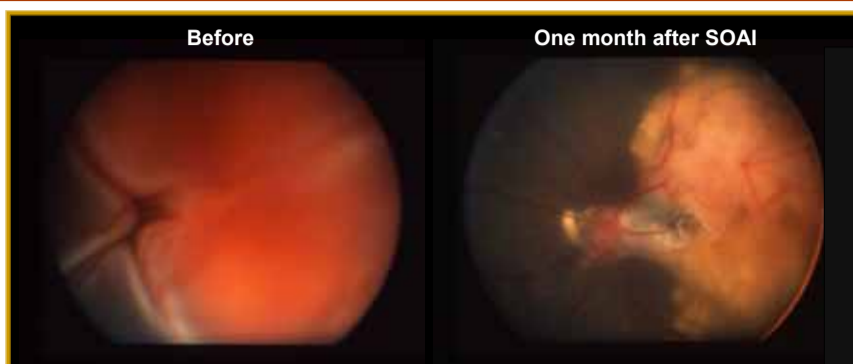
## SOAI System



## Angiograms of Selective Ophthalmic Arterial Injection



## Retinoblastoma (Reese-Ellsworth Va)



## Retinoblastoma (Reese-Ellsworth VIa) (reduced tumors were treated by diode laser TTT)



## Object of this Poster

To report our experience of the selective ophthalmic arterial injection of melphalan for eye-preservation treatment of retinoblastoma in Toho Medical Center Ohashi Hospital since 2005.

## Method

Seven patients with retinoblastoma underwent 2 courses of VEC systemic chemotherapy by pediatricians in Tokyo Jikei Medical University Hospital. After that procedure, the selective ophthalmic arterial injection of melphalan (7.5mg/m<sup>2</sup> at the first time, 5.0mg/m<sup>2</sup> from the 2nd time) was conducted 5-2 times. Laser therapy with diode laser, brachytherapy with Ruthenium-106, vitreous injection of 8µg of melphalan or enucleation were performed once or several times according to the situation.

## Table of Patients (as of Jan. 2007)

Case	Sex	Age	Heredity	Side	R-E Stage	Procedures	Observation Time	Outcome
1	F	1 m	familial	R	Ib	TTT (2), SOAI (2)	6 m	cure
				L	IIIb	TTT (4), SOAI (4)	6 m	cure
2	M	1 m	familial	R	Ib	TTT (5), SOAI (2)	10 m	cure
				L	Ib	TTT (4), SOAI (2)	10 m	cure
3	F	2 y 0 m	sporadic	R	Ila	VEC (6), TTT (1), SOAI (4), Vit, (1) En	3 m	ENC
				L	Ila	VEC (6), TTT (4), SOAI (3)	5 m	cure
4	M	1 y 6 m	sporadic	R	Vb	VEC (2), TTT (7), SOAI (11), VI (1)	2 m	treating
5	F	1 y 6 m	sporadic	R	Ila	VEC (2), TTT (5), SOAI (9), Ru (1)	1 m	treating
6	F	1 y 2 m	sporadic	L	Vb	VEC (2), TTT (1), SOAI (3), En	9 m	ENC
7	F	1 y 8 m	sporadic	R	Ila	VEC (2), TTT (2), SOAI (3), VI (3), En	9 m	ENC

VEC : Systemic chemotherapy with vincristine, etoposide & carboplatin  
TTT : Transpupillary thermotherapy with diode laser,  
SOAI : Selective ophthalmic arterial injection of melphalan VI: Vitreous injection of melphalan  
ENC : Enucleation, Vit: Vitrectomy, ( ) = times

## Summary of the Patients

- ◆ Age : 20-1 months
- ◆ Sex : Male: 2, Female: 5
- ◆ Familial cases : 2 (4eyes)
- ◆ Sporadic cases : 5 (6 eyes) (Unilateral: 4, Bilateral 1)
- ◆ Stage (Reese Ellsworth Grouping) : Ib: 3, Ila: 4, IIIb: 1, Vb: 2
- ◆ Outcome : Cure: 5, Treating: 2, Enucleation: 3

## Summary of SOAI

- ◆ Cases : 7 (10 eyes)
- ◆ Times : 31
- ◆ The time required : 72 ~ 26 (Med.: 52) min
- ◆ Complications : During SOAI: Nothing, After SOAI: Nothing

## Conclusion

- 1) The selective ophthalmic arterial injection of melphalan (SOAI) is effective and safe for eye-preservation therapy of retinoblastoma.
- 2) SOAI is effective on residual or recurrent tumors treated by VEC systemic chemotherapy without severe side effects.

## Acknowledgement

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## References

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