

Introduction

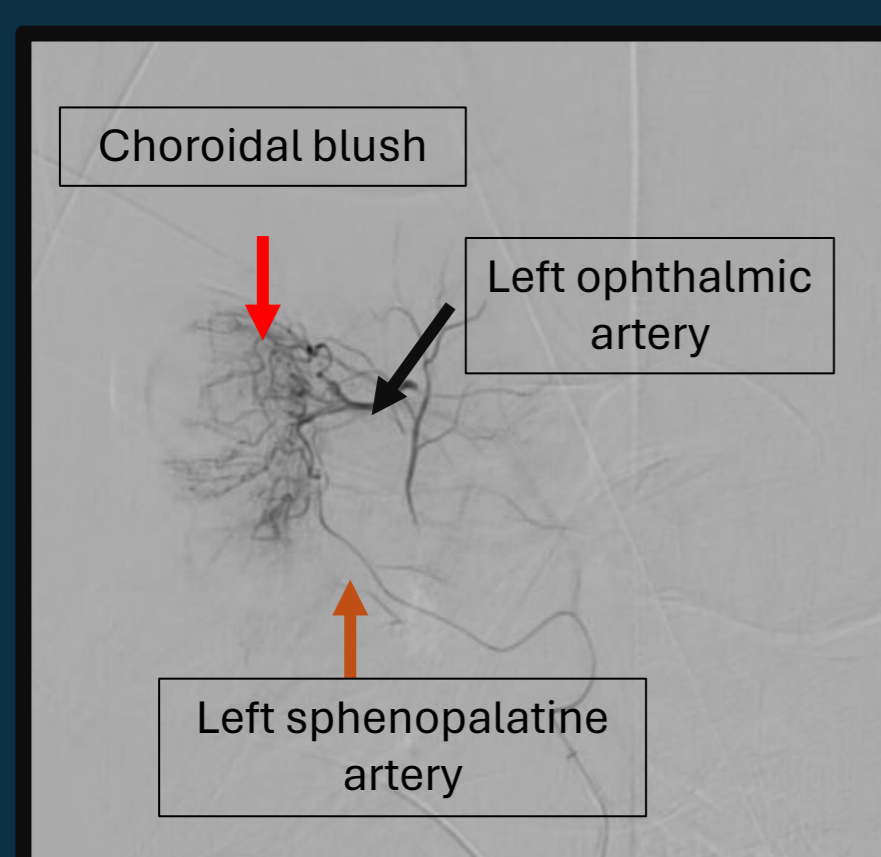
Intraarterial Chemotherapy (IAC) is a superselective ophthalmic artery chemotherapy, widely recognized as a primary therapeutic approach for retinoblastoma. IAC is crucial in salvaging advanced-stage diseases that would otherwise require enucleation. However, challenges may arise in catheterization or visualizing the ophthalmic artery, necessitating the exploration of alternative routes. The collateralization of the ophthalmic artery from the external carotid artery serves as a commonly employed alternative route for IAC.

Methods

The IAC procedure utilized a 5F angiographic catheter with a 0.032" guidewire to access the common carotid artery. In cases where visualizing the ophthalmic artery was challenging, alternatives involving branches from the external carotid to the orbital area were selected. A 1.9F microcatheter and a 0.012" micro-guidewire were employed for the super-selective introduction of the ostium of collateralization. Before administering the chemotherapy, a nasal vasoconstrictor and topical phenylephrine were administered to minimize the flow onto the forehead and nose. The chemotherapy agent used was melphalan, administered in diluted form in 30 ml of normal saline over a 30-minute period in a pulsatile fashion. An angiogram was conducted afterward to rule out any thromboembolic events.

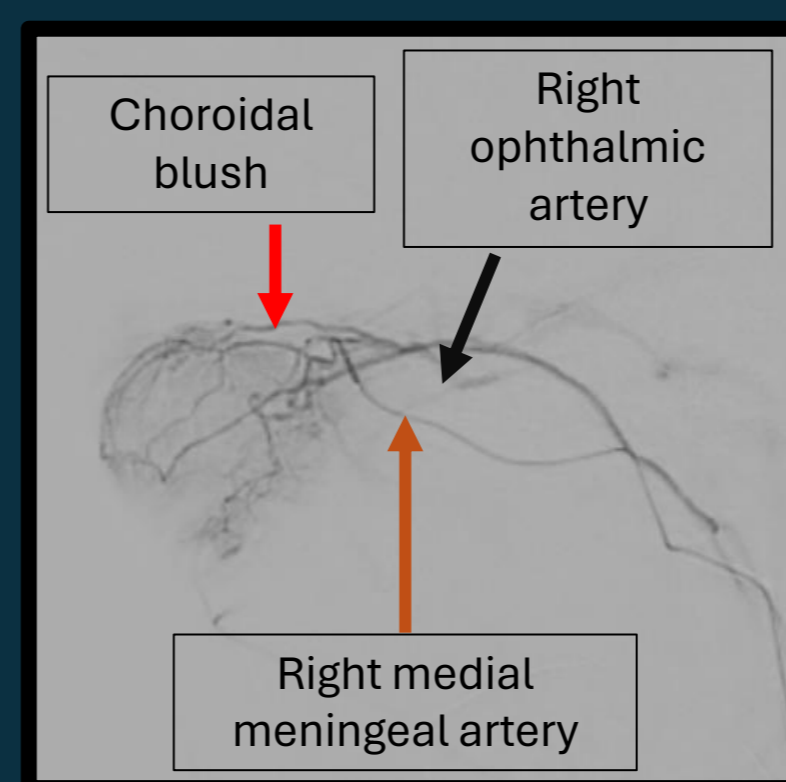
Case Description

Case 1



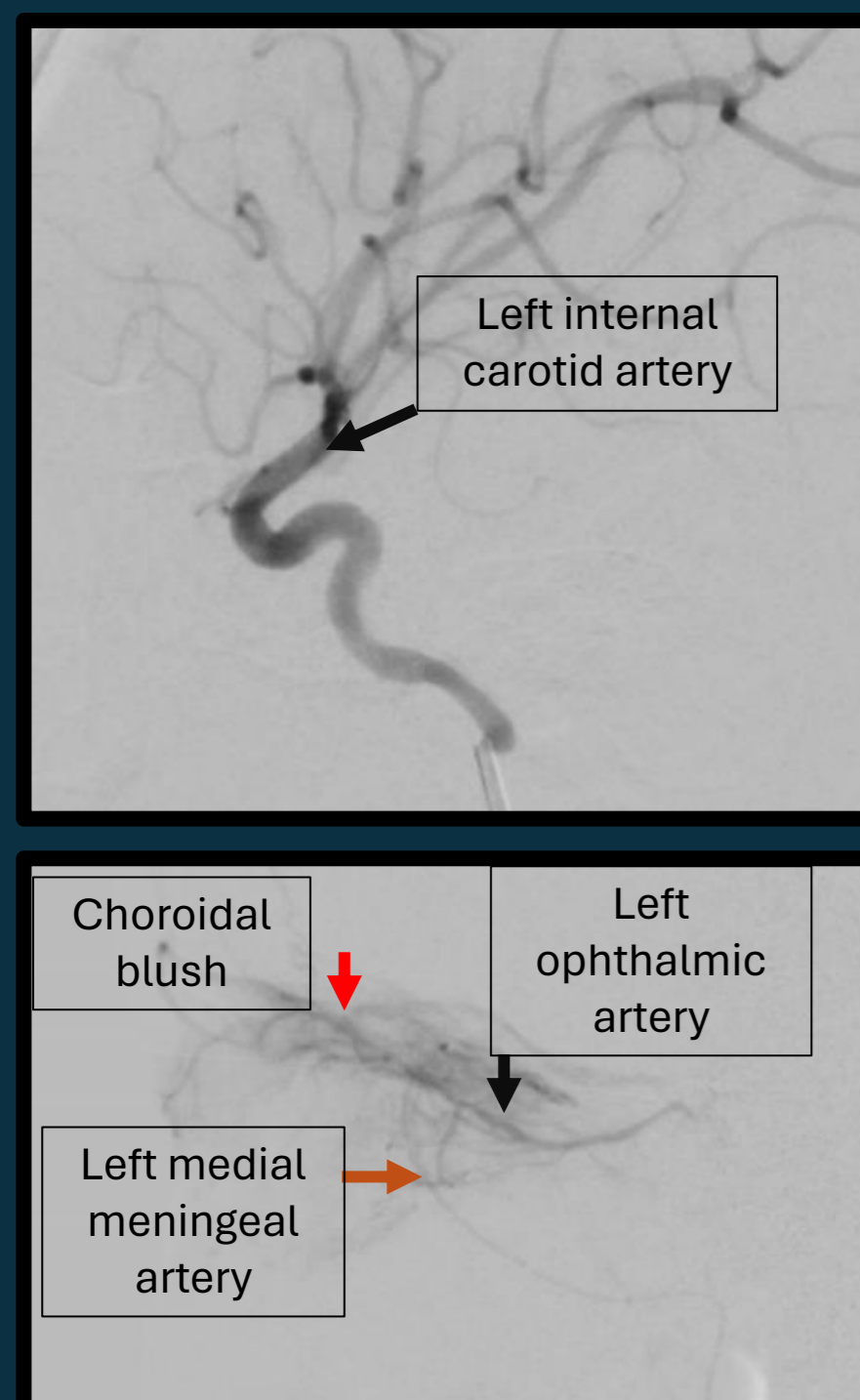
A 3-year-old boy diagnosed with group B retinoblastoma in the left eye underwent IAC. The left sphenopalatine artery, identified as collateralizing to the orbital region, was chosen as the IAC route for this intervention. Following super-selective catheterization, visualization of choroidal blush was achieved, and melphalan was administered.

Case 2



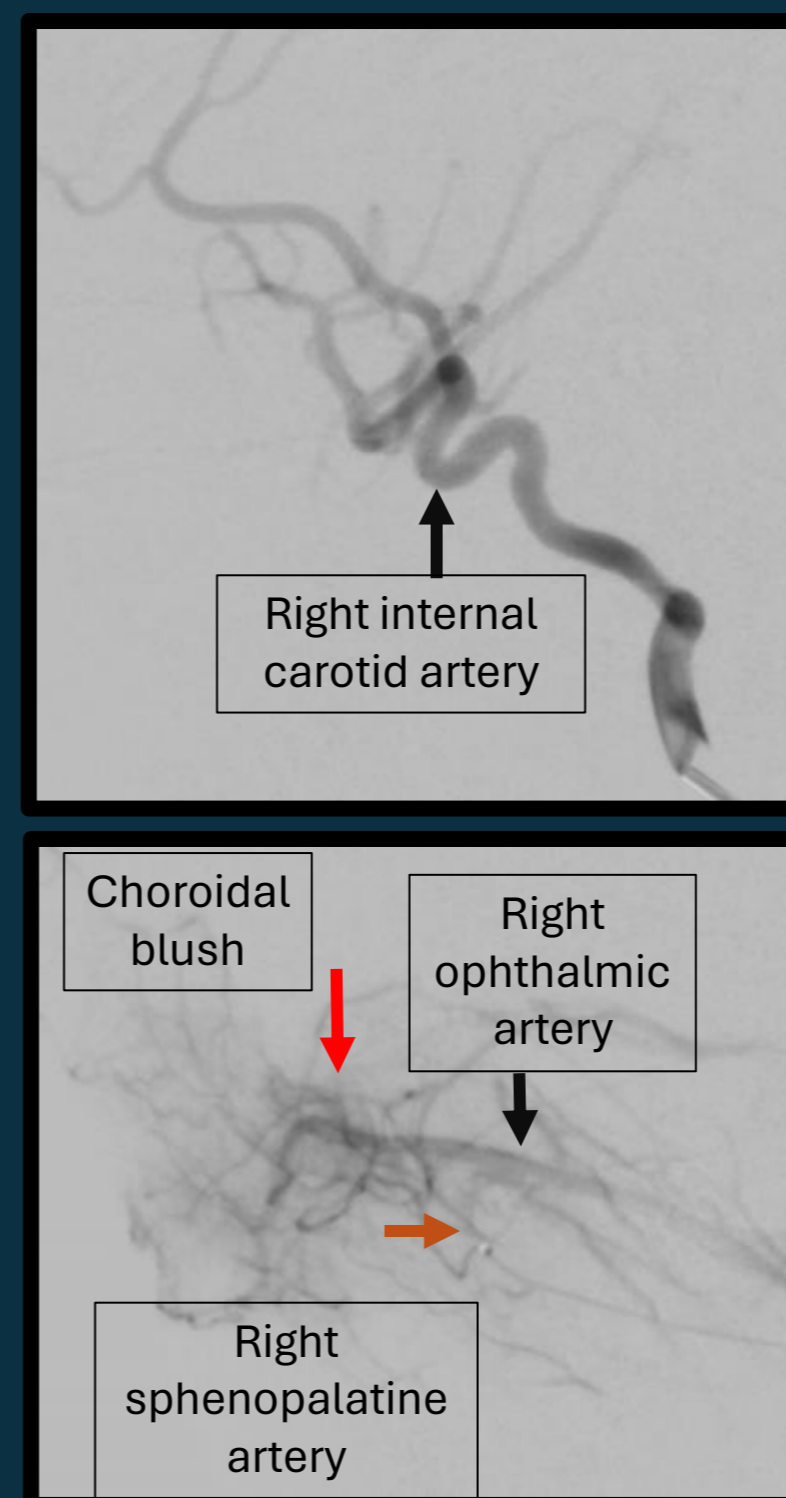
A 2-year-old boy diagnosed with group C retinoblastoma in the right eye underwent IAC. The right medial meningeal artery was used to administer melphalan. Choroidal blush was observed during the procedure, and melphalan was subsequently administered.

Case 3



A 2-year-old boy diagnosed with group C retinoblastoma in the left eye underwent IAC. Initially, the left ophthalmic artery was visualized, but it did not exhibit a choroidal blush appearance during the angiogram. Subsequently, the left medial meningeal artery was employed and successfully filled the ophthalmic artery. Choroidal blush was observed in this attempt, and melphalan was administered.

Case 4



A 3-year-old girl diagnosed with intraocular recurrent group C retinoblastoma in the right eye underwent IAC. No choroidal blush was observed during the angiogram through the right ophthalmic artery. However, an anastomosis between the right sphenopalatine artery and the right ophthalmic artery was identified, and a choroidal blush was observed when performing angiogram. Melphalan was then administered through this artery.

Discussion

We performed IAC by superselectively catheterizing the target artery without utilizing balloon occlusion. External carotid artery branches were visualized to anastomize with the orbital apex region. In these studies, the sphenopalatine and medial meningeal arteries were most used to perform IAC. Most studies indicate that the medial meningeal artery is the most utilized artery as an alternative route for IAC, aligning with the findings in these cases. Other routes were also noted as they correlated with the orbital apex. Another factor influencing the success of the procedure is the visualization of choroidal blush, which was observed in every procedure, instilling confidence in the efficacy of the intervention.

Conclusion

The branches of the external carotid artery could be considered as one of the entry ports when performing IAC. Several branches of the external carotid artery may anastomose with the ophthalmic artery and provide a choroidal blush, indicating technical success in administering chemotherapy.

References

1. Pekacka A. The role of intraarterial chemotherapy in the management of retinoblastoma. *Journal of Ophthalmology*. 2020 Jan 24;2020:1–16. doi:10.1155/2020/3638410
2. Quinn C, Tummala R, Anderson J, Dahlheimer T, Nascene D, Jagadeesan B. Effectiveness of alternative routes of intra-arterial chemotherapy administration for retinoblastoma: Potential for response and complications. *Interventional Neuroradiology*. 2019;25(5):556–61. doi:10.1177/1591019919831953
3. Jia S, Wen X, Zhou M, He X, Han M, Fan J, et al. Comparison of intra-arterial chemotherapy efficacy delivered through the ophthalmic artery or external carotid artery in a cohort of retinoblastoma patients. *Frontiers in Medicine*. 2021 Jun 11;8. doi:10.3389/fmed.2021.658305