



EFFICACY OF TRYPAN BLUE ASSISTED CAPSULORRHEXIS IN SMALL INCISION CATARACT SURGERY

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ABSTRACT

With the advent of microsurgical techniques, the Cataract surgery has been revolutionized. In this study the effectiveness of 'Trypan Blue' assisted capsulorhexis in small incision cataract surgery is evaluated.

Methodology: Total of 50 cases of cataract was included and were divided into two groups 1st control group (25cases) where no dye was used and 2nd group (25cases) where Trypan Blue was used and all the data were analyzed. **Result & Conclusion:** The CCC could be completed in 88% cases in trypan blue group as compared to only 72% cases in control group which means that trypan blue dye improves recognition of peripheral rim of anterior capsule making the completion of CCC feasible in all cases.

KEYWORDS : Capsulorhexis, Cataract, Trypan.

INTRODUCTION:

The irresistible urge of attaining best possible visual outcome has been the single driving force in the evolution of cataract surgery. With the advent of microsurgical techniques, the Cataract surgery has been revolutionized.

Gimble and Neuhann⁽¹⁾ developed CCC independently that enabled us to perform In-the-Bag IOL implantation. Thus continuous curvilinear capsulorhexis (CCC) has become the ideal anterior capsulotomy for planned ECCE. CCC also offers other advantages such as better cortical cleanup and hydroprocedures, long term centration of IOL etc.

In today's clinical practice, white, mature, hypermature and intumescent cataracts still constitute a significant volume of cataract surgical load. One of the biggest bug bears for cataract surgeons till today is to perform a CCC in the absence of a red reflex in such cases and causes errant capsule tearing which is difficult to control. Thus phacoemulsification in such patients still remains a challenge.

To aid in achieving the ideal capsulotomy in such cases i.e. CCC, various techniques and various dyes such as Fluorescein, methylene blue, Indocyanine green, trypan blue etc. have been used for staining the anterior capsule and have served as a third eye for the surgeons in helping perform CCC. In this study we tend to evaluate the efficacy and safety of one such dye Trypan Blue in performing CCC without red reflex.

AIMS & OBJECTIVE:

To evaluate the effectiveness of trypan blue dye assisted capsulorhexis in small incision cataract surgery.

To analyze intraoperative and postoperative complications with the use of trypan blue.

To assess the advantage of trypan blue in the performance of capsulorhexis in cataracts with absent red reflex.

MATERIAL & METHOD:

This prospective study was conducted in the Department of Ophthalmology GRMC, Gwalior (M.P) and Amltas institute of medical sciences, Dewas (MP). 50 consecutive cases of cataract were divided into two groups of 25 cases each. 1st Control group- No dye used for CCC and 2nd Trypan Blue group- Dye used for CCC.

Pre operative evaluation: Patients were admitted one day prior to surgery, detailed history taken followed by complete systemic and ophthalmic examination. Preoperative corneal curvature recording, A-scan biometric analysis and IOL power calculations were done. An informed written consent was taken, maximum mydriasis was achieved and patients were

prepared for surgery. Patients with a sunken eye, corneal decompensation, increased intraocular pressure, uveitis, subluxated lens, anterior capsular tears or previous intraocular surgery were excluded.

Surgical Steps: Superior rectus suture was given and fornix based conjunctival flap was made to expose the sclera at the site of tunnel incision usually at 12 o'clock position. A Scleral incision of 6-9.00 mm was given in SICS with PCIOL. A side port was made. In cases where rhexis could not be completed or extended to peripherally, it was converted into a can opener capsulotomy.

Trypan Blue Staining: After the side port entry was made, the anterior chamber was inflated with air with a 26G cannula till a single large air bubble was formed. 0.1 to 0.2 ml of 0.1% trypan blue was injected over the anterior capsule under the air bubble through the side port incision. After 30 to 45 seconds the air bubble in the anterior chamber was replaced with viscoelastic substance and the capsulorhexis was performed. **Capsulorhexis and IOL implantation:** Capsulorhexis was performed with Ultrata forceps in most of the cases and in some cases with 26 G needle. Size of the capsulorhexis was 5-6 mm central and circular. The blue stain of the anterior capsule at the outline of the capsulorhexis was clearly visible and distinguished from the underlying grayish - white lenticular tissue. After capsulorhexis the internal corneal incision was made.

A routine gentle hydrodissection/ hydrodelineation were performed by injecting ringer lactate solution into the deeper layers of the lenticular material at multiple locations using a 5cc syringe and 26G cannula. Using the viscoexpression technique the nucleus was removed out of the anterior chamber in ECCE with PCIOL. Remaining cortex and epinucleus was removed by irrigation and Aspiration. PCIOL of adequate power was implanted in the capsular bag.

Postoperative Care and follow up: Post operative medicines were prescribed to all the patients and patients were subjected to visual acuity testing and slit lamp examination. The follow up was done on day 1, 7, 30 and 45 days. Final refraction was determined at the 8th postoperative week and the patients were prescribed appropriate glasses.

OBSERVATION AND RESULTS:

Table - 1

Morphological categorization of different types of cataract

Type of cataract		Control Group		Trypan Blue Group	
		No.	%	No.	%
Cortical	Mature	9	36	10	40
	Hypermature	1	4	4	16

	Intumescent	5	20	3	12
	Post Polar & Post Subcapsular Cataract	7	28	5	20
Nuclear		3	12	3	12
Total		25	100	25	100

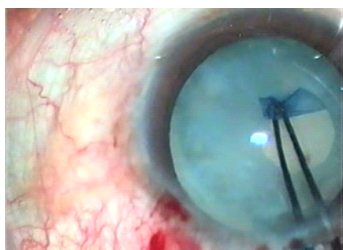
The cortical mature cataract was the most common morphological variety

Table – 2
Completion of Capsulorhexis

Capsulorhexis	Control Group		Trypan blue group	
	No.	%	No.	%
Completed	18	72	22	88
Converted into Can opener	7	28	3	12
Total	25	100	25	100

Complete capsulorhexis was achieved in 72% of cases in control group and 88% of cases in trypan blue group.

Image - 1



Continuous curvilinear capsulorhexis using Trypan blue dye and Utrata forcep.

DISCUSSION:

In the present study 68% cases were males and 32% were females in both groups. Majority of cases in both groups were aging between 51 and 70 years i.e. 64% in the control group 68% in the trypan blue group.

The cortical variety of cataract comprised 88% in both the groups. 36% in the control group and 40% in the trypan blue group had mature cataract. Hyper mature cataract constituted 4% in control group and 16% in the trypan blue group. Thus, majority of cases (56%) had white cataract in trypan blue group.

In our study, 0.1 cc of 0.1% trypan blue was used for 10 seconds. Chang et al⁽²⁾ also suggested that a minimum of 0.1% concentration was thought to be necessary for staining. Yetik et al⁽³⁾ found that a concentration as low as 0.0125% was adequate for staining the capsule. Kothari et al⁽⁴⁾ and Melles et al⁽⁵⁾ also used 0.1% trypan blue for 5-10 seconds. Thus, 0.1% concentration of the dye used for about 10 seconds is a safe and effective concentration of trypan blue for staining the anterior capsule.

Capsulorhexis with 26G needle was done in 68% of cases in both groups, while Utrata forceps was used in 32% of cases in both groups. It was much easier to initiate a flap with the help of 26G needle. Besides, use of the needle resulted in a more stable anterior chamber because less amount of viscoelastic substance escapes during CCC. Utrata forceps which required constant replenishment of viscoelastic substance to keep it formed. However, Utrata forceps provided a better hold and control of the flap particularly in the cases where the rhexis had a tendency to escape or where the intralenticular pressure was high.

In all cases Hydroxypropyl methylcellulose solution (2%) was used for formation of anterior chamber during capsulorhexis.

Capsulorhexis could be completed in 72% cases in control group, and 88% cases in the trypan blue group. Staining of the anterior capsule allowed an easy recognition of the blue coloured capsular flap against the white background of the lens matter.

Kothari et al⁽⁴⁾ noticed quick and homogenous staining in 100% of cases. Jacob et al⁽⁶⁾ also used trypan blue under the air to stain the anterior lens capsule and found that trypan blue adequately stained the anterior lens capsule in all the cases.

We performed staining of the anterior lens capsule with trypan blue 0.1% under a single large uniform air bubble and found a quick homogenous and dense staining in all our cases.

Intra operative problems: Peripheral run off of the anterior lens capsular rim was seen in 28% cases in the control group and in 12% cases in the trypan blue group, comparable with study of Goldman J.M⁽⁷⁾. It is more common in mature developmental and traumatic cataracts without staining because of absent red reflex while staining helps in visualizing anterior capsule from rest of the lens and thus made capsulorhexis easier.

In control group, PC rent was noted in 4% cases. The rent was observed in the patient of posterior polar cataract. In trypan blue group, the PC rent occurred during cortical aspiration in a patient of post subcapsular cataract. The PC rent was a small one without vitreous prolapse and PCIOL was safely implanted in bag.

CONCLUSION:

The trypan blue is a new tool to enhance visualization of anterior capsule in cases of white cataract and it has become a world standard technique. The contrast between the blue stained anterior lens capsule and the white cortex made the recognition of peripheral extension much easier. For many series of dye's, 'Trypan Blue' was chosen because it was most effective in a relatively low concentration, it was known for its biocompatibility with the corneal endothelium and it had been used intra-ocularly without side effects.

The use of trypan blue for performing capsulorhexis offers distinct surgical advantages. It helps to initiate, perform and complete the CCC even in cases of no red glow, improves cortical clean up and IOL implantation.

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