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RESEARCH ARTICLE

MODIFIED TECHNIQUE OF TRANS-NASAL TRANS-SPHENOIDAL MICRO-DECOMPRESSION FOR PITUITARY ADENOMAS-AN EXPERIENCE.

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Corresponding Author*Mohammad Akbar Shah.****Abstract****Background:-** Weighing 0.6 grams the pituitary has unassuming regulatory functions on human body and the tumors of pituitary explain the pervasive might of this tiny structure.**Patients and methods:-** we carried out a prospective comparative study on two patient groups of thirty patients each. One of the groups underwent conventional technique for tumor decompression with xylocaine-adrenaline nasal mucosa infiltration and the other one underwent a modified technique of tumor decompression with normal saline infiltration. In addition we used gelatin foam in empty sella in modified technique in place of fat as is done in conventional surgical procedure. The results of two groups were compared. The patients with tumor infiltration into the sinuses and major vessels were excluded from the study.**Results and conclusion:-** Modified surgical technique is safe and very effective in terms of in perioperative hemodynamics, blood loss, surgical field and post-operative MRI interpretation.

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Introduction:-

Most accounts of the history of pituitary surgery began with an operation done by Paul a British surgeon for an acromegalic patient in 1892 via a subtemporal decompression. Later Horsely operated a series of pituitary tumors using temporal and subfrontal approaches and reported it in 1906. Major technical and conceptual advances were made from Viena and Schloffer in 1907 was first to employ a lateral rhinotomy type surgery for tumor removal¹. Later Guoit² and Hardly^{3,4} established technical and conceptual modification of these procedures which forms the basis of present day transsphenoidal surgery.

Patients and methods:-

This study was carried out at our superspeciality hospital for a period of two years. It was a prospective comparative study where in two groups of thirty patient each were compared in terms of perioperative hemodynamics, intraoperative bleeding, surgical field and post operative imaging interpretation. All the patients were subjected to baseline investigations, pituitary hormone analysis and pituitary imaging. Patients with functional pituitary tumors with out mass effect and infiltration into major vessels an base of skull were excluded from the study. The study group patients underwent modified surgical technique with use of normal saline in place of xylocaine-adrenaline and gel foam was placed into empty sella in place of fat as is done conventionally. The anesthetist was blind to the drugs infiltrated into nasal mucosa. Hemodynamics, amount of bleeding and surgery times were recorded in all the patients. Post operatively at 3 months MRI Brain was done to compare sellar cavities. All the data was compiled and analysed statistically by descriptive statistical analysis by using SPSS and Microsoft excel softwares.

Results:-

The patients included in our study ranged from 18-62 years in control group and 18-70 years in case study group. The total number of males were 10(33.3%) and females were(66.7%) in control group. The total number of males

were 13(43.3%) and females were 17(56.7%) in case study group. The mean age in control group was 40.4 ± 13.2 and 43.9 ± 13.3 in case study group.

Pituitary tumors were divided into non-functional and functional adenomas. The NFPT were 15(50%) in control group and 16(53%) in case study group. The most common tumor was somatotropinoma in both the groups.

Preoperative MRI findings showed 25(83.3%) patients had macroadenoma in control group and case study group each. Tumors were graded according to Modified Hardy's grade. Majority of patients had grade 3 tumors in both the groups.

Hemodynamic changes were seen in 63.3% of patients in control group viz 10% in case study group. The need for antihypertensive medication was 60% in control group viz 10% in case study group. There were statistically significant differences in heart rate and mean arterial blood pressures in the two groups.

The sellar graft and second incision was used in all 30(100%) patients of control group and no patient of case study group. In this respect case study group was less time consuming and cosmetically better.

Most of the patients in our study had normal course in both the groups. Transient diabetes insipidus was the most common complication seen in 20% of patients in control group and 26% of case group.

Postoperatively MRI interpretation was easy in case group as compared to control group of patients in terms of differentiating hematoma, residual tumor and implanted graft.

Discussion:-

The pituitary adenomas are the most common tumors in the sellar region and makes upto 10-15% of all the intracranial tumors. The major clinical presentations are endocrine disturbances, features of raised intracranial tension and visual disorder. The objective of removing pituitary adenoma is not limited to relieving the compression of the optic nerve and optic chiasma by the tumor but rather includes total resection of the tumor and amelioration or recovering of the pituitary function. The age range of patients in our study group and control group were 18-62 and 18-70 years respectively. The age groups were nearly comparable to those seen by R-X Cheng where age ranged from 13-69 years⁵. Their patients were diagnosed at an earlier age and ours were little delayed because majority of our patients were from rural background.

In our study maximum of our patients were in nonfunctional pituitary tumors 15(50%) in case study group and 16(53.3%) in control group. The most common pituitary tumor in both case and control group was somatotropinoma 9(30%) in case group and 7(23%) in control group of patients. The results for nonfunctional pituitary tumors and functional pituitary tumors were comparable to that seen by Amir R Dehdashti in 2008⁶.

The Hardy grade 3 tumor percentage was the most common grade seen in our study and the results were comparable to that seen by Xue-Fei Shou MD⁷.

The control group hemodynamic changes were present in 63.3% patients whereas it was only seen in 10% of patients in study group. The difference is statistically significant with p value of <0.05 . As a result of more hemodynamic changes in control group there was more blood loss and poor operative field visibility. The study conducted by Pasternak J et al 2004, Chelliah Y R et al 2002, Keegan MT et al 2006, found that during preparation, the mucosal surfaces of the nose are infiltrated with local anesthesia and epinephrine solution to reduce bleeding and facilitate dissection. The addition of lidocaine to epinephrine increases the arrhythmogenic threshold dose of epinephrine when compared with epinephrine in saline injection. Injection may be associated with dysrhythmias and hypertension. This hypertension may be significant and myocardial ischemia and cardiac troponin increase has been reported in patients without coronary artery disease. Patients taking beta adrenergic blockers may develop dangerously high blood pressures secondary to unopposed alpha effects of epinephrine. IV therapy with phentolamine or direct vasodilator therapy may be necessary; however increasing the patients depth of anesthesia may prove adequate. If an endoscopic approach is planned infiltration of mucosal surfaces may be necessary and the administration of topical vasoconstrictor may prove adequate.^{8,9,10,11,12,13,14..}

As is evident from above discussion our findings were consistent with the international data.

In our study in control group sellar graft(fat) was used in all the patients and second surgical incision was needed in all the patients where as no sellar graft was used in the reconstruction of sella in case group and for the closure of sella bone piece and gelatin foam was used. In 3 patients in case group there was intraoperative CSF leak and in addition to bone piece gel foam was used. The most common complication was diabetes inspidus which was seen in 20% in control group and 8% in case group. This DI was transient which recovered by 3-4 days of surgery. Meningitis and epistaxis was seen in one patient each.

Post operative MRI interpretation(image 1 and 2) in differentiating hematoma, residual tumor, implanted heterologous material and sellar graft was done in all patient after 3 months postoperatively.

The postoperative MRI interpretation(image 1 and 2) was easy in majority of patients in case study group and it was difficult to interpret in patients in control group which was statistically significant.

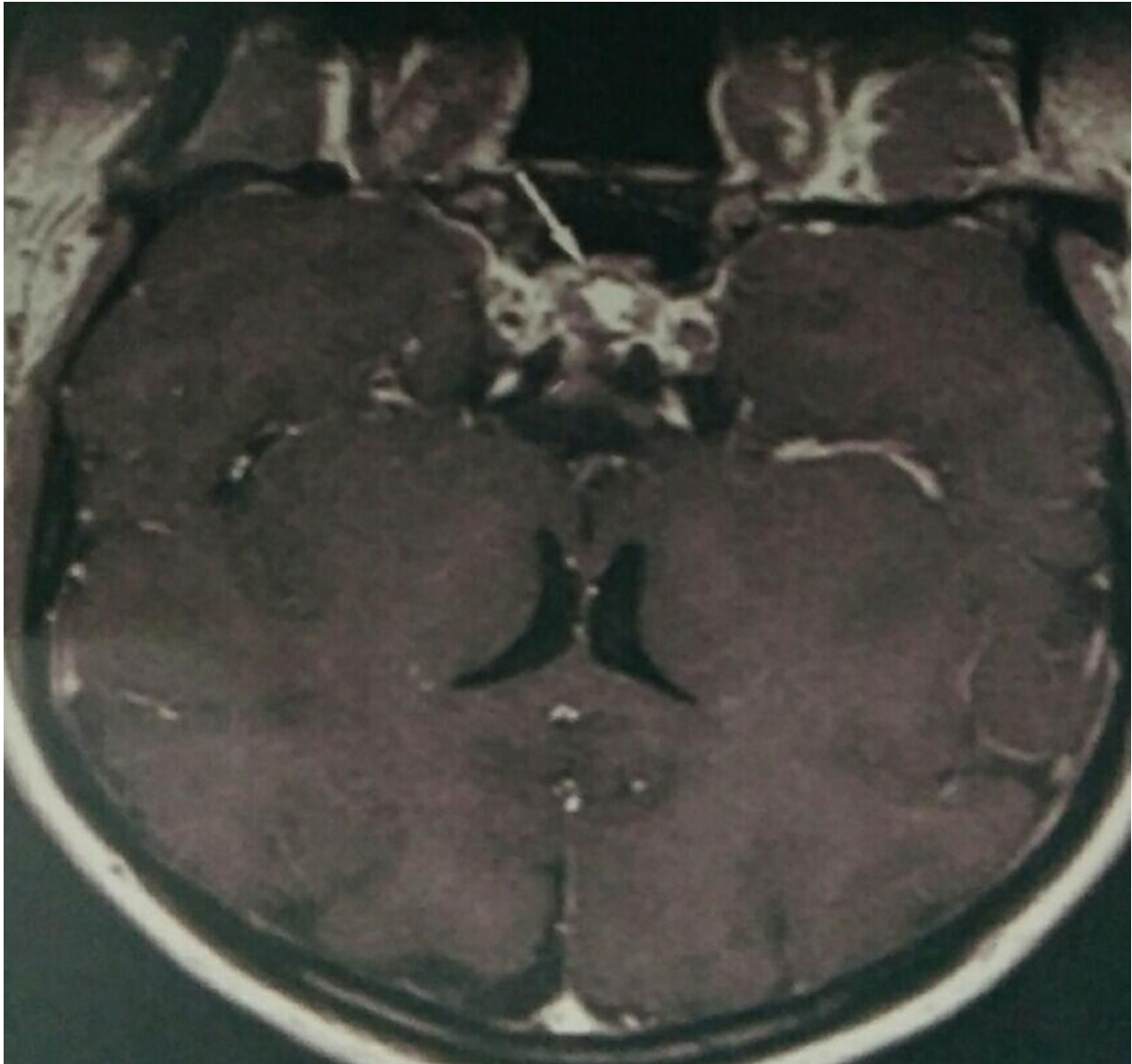


Fig.1:- Post operative MRI interpretation showing Sellar graft(fat) used in control group

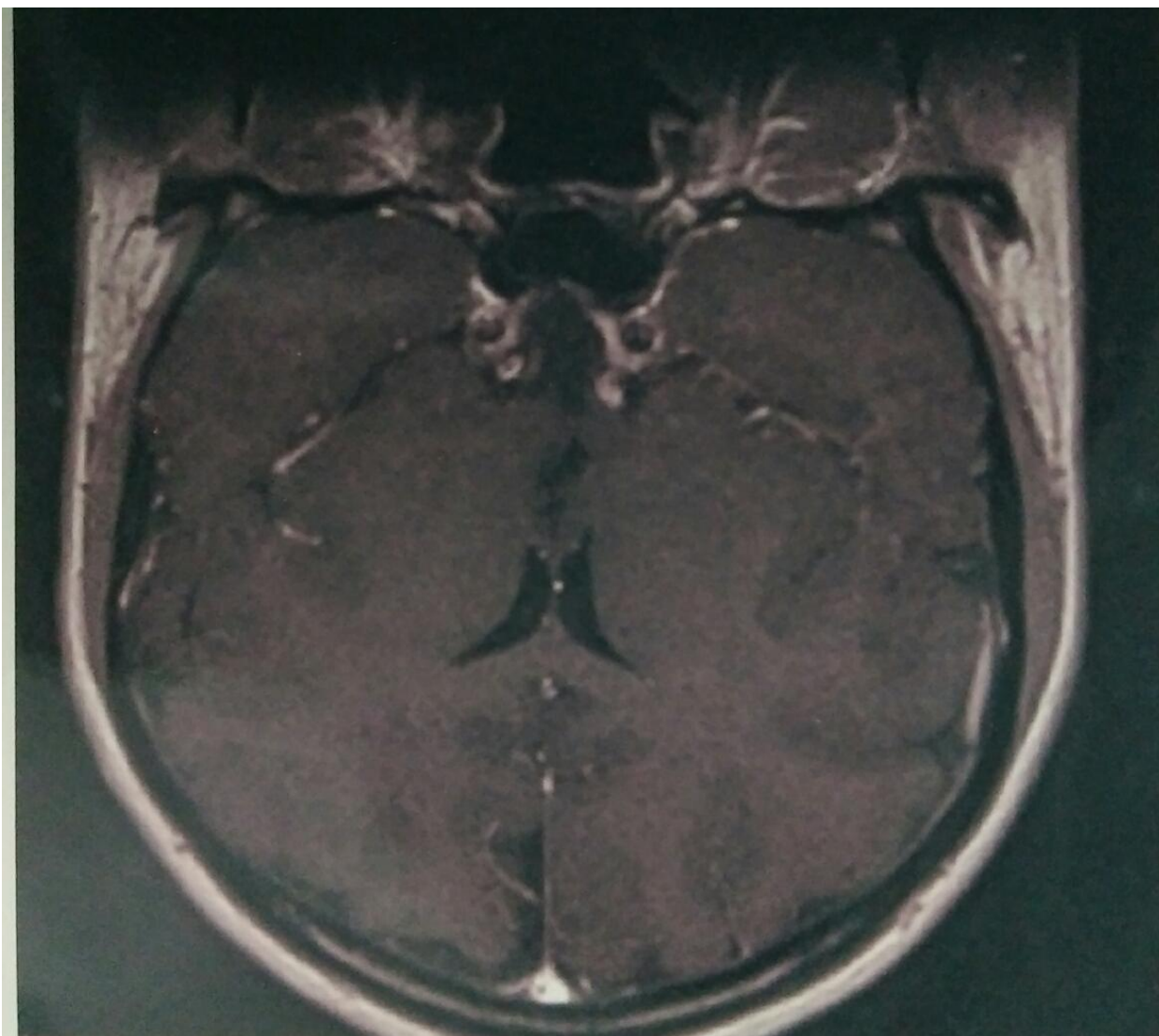


Fig.2:- The postoperative MRI interpretation in case group where no sellar graft was used in the reconstruction of sella and for the closure of sella bone piece and gelatin foam was used.

Rolf W. Seilar et al 2000 conducted a study where patients underwent surgery for pituitary adenomas, cysts and craniopharyngiomas. Sellar reconstruction was performed with a commercially available synthetic absorbable patch composed of polyglactin 910/poly-p-dioxanone, gelatin foam and fibrin glue. The patch is essentially reabsorbed in 2-3 months and is replaced by fibrocollagen tissue. Because of progressive resorption of the substitute material the interpretation of post operative MRI studies was not significantly hindered.¹⁵

Similar study results were also reported by Sonnenburg et al in 2003¹⁶ and Joanna et al in 2010¹⁷.

Conclusion: Modified surgical technique is safe and very effective in terms of in perioperative hemodynamics, blood loss, surgical field and post-operative MRI interpretation.

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