



**ORIGINAL RESEARCH PAPER**

**Neurosurgery**

**DSA IN SPONTANEOUS SUBARACHNOID HEMORRHAGE IN A TERTIARY CARE HOSPITAL IN INDIA: OUR INITIAL EXPERIENCE**

**KEY WORDS:** subarachnoid haemorrhage, digital subtraction angiography, aneurysm

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**ABSTRACT**

**Background:** Neuroendovascular surgery is the new armamentarium in neurosurgical care, requiring good understanding of craniocervical vascular anatomy, aortic arch anatomy, clinical skills and long learning curve. Skills will develop by performing regular diagnostic cerebral angiography.

**Aim:** To evaluate the feasibility of performing diagnostic cerebral digital subtraction angiography in a tertiary care hospital.

**Materials and Methods:** A retrospective analysis of 87 diagnostic DSA performed since December, 2017–May 2018 in cardiac catheterization laboratory.

**Results:** Our procedural success rate was 97.22%. Procedure related morbidity was 1.15% as there occurred minor thromboembolism in a single patient.

**Conclusions:** Diagnostic cerebral angiography is feasible in tertiary care hospital using cardiac catheterization laboratory.

**INTRODUCTION:**

SAH is a neurological emergency characterized by haemorrhage into the subarachnoid space. It is of great importance to diagnose the condition at the earliest because of the associated high morbidity and mortality. Aneurysmal rupture is the most common cause of spontaneous non-traumatic SAH. These are the patients in whom a rebleeding can be disastrous. These aneurysms can be missed due to vasospasm secondary to the SAH, temporary thrombosis of the aneurysm, alteration of blood flow dynamics following SAH, observer error, technical factors etc. SAH occur at an annual incidence rate of 10.0–10.9 cases per 100,000 population. About 20% of them rupture during a lifetime. The gold standard for evaluating SAH remains 4-vessel cerebral DSA. However DSA has a false negative rate of 5 to 10%. Spontaneous SAH where angiography fails to reveal any lesion accounts for 13 to 22% of all cases of SAH.

**AIMS & OBJECTIVES:**

To evaluate the feasibility of performing diagnostic DSA in resource limited tertiary care hospital and evaluate its outcome. To find out usefulness of DSA as a diagnostic tool in patients with spontaneous non-traumatic SAH. We have a long term aim of establishing a neuroendovascular therapy unit.

**MATERIALS & METHODS:**

Our study is a retrospective analysis of diagnostic DSA performed since December, 2017–May, 2018 in cardiac catheterization laboratory by trainee endovascular neurosurgeon. A total of 87 diagnostic cerebral DSA performed within that period. A complete clinical and detailed radiological examinations were done followed by either conservative or operative management. All patients in this study were enrolled and admitted either directly through the OPD of neurology, neurosurgery or in surgery/medicine wards where they were managed under our guidance.

**Statistical Data Analysis:**

After collecting all the data, a grand chart was prepared using Microsoft Office Excel 2007 and statistical analysis was performed using SPSS-20 statistical software for analysis of data. Mean and standard deviation (SD) were calculated separately. P-value of <0.05 was taken as significant.

**OBSERVATION & RESULTS:**

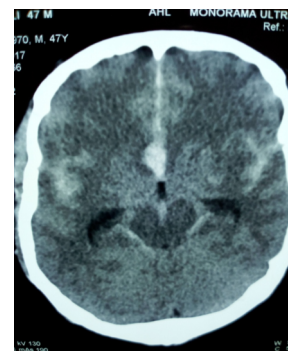
We included total 87 patients of spontaneous non traumatic SAH(Fig1) in our study.

**Demographic profile:** Out of the 87 patients, 47(54.02%) were female and 40(45.98%) were male. 50 (57.47%) of them were in

the age group of 41-60 years, 23(26.43%) in between 21-39 age group and 12(13.79%) were above 60 yr age group.

**Clinical presentations:** Sudden onset severe headache was the most common clinical presentation and observed in 78 (89.65%) patients. Nausea and vomiting were seen in 40(45.97%) cases. Focal neurological deficits in the form of aphasia, limb paresis, cranial nerve palsy were seen in 37 (42.53%) cases. Meningismus was present in 30(34.48%) cases, seizures were present in 5(5.75%) cases and altered sensorium was present in 9 (10.34%) cases.

**DSA findings:** Aneurysms were detected in 57 (65.52) cases. ACOMA(Fig2) aneurysms were most common 23(40.35%). MCA aneurysms were found in 12(21.05%) cases, posterior circulation aneurysms were found in 8(14.04%) cases. ACA, ICA bifurcation and other locations aneurysm were detected as 5(8.70%), 3(5.26%) and 6(10.53%) cases respectively.



**Figure 1: Diffuse SAH**



**Figure 2 : Acoma aneurysm**

**DIFFICULTIES:**

Our procedural success rate was 97.22%. Procedure related morbidity was 1.15% as there occurred minor thromboembolism in a single patient. We faced difficulties in few cases due to severe atherosclerosis of iliac artery and bovine type of aortic arch (Fig 3).



**Figure 3: Bovine type of aortic arch**

**DISCUSSION:**

Endovascular neurosurgery is a well established field of modern medicine in first world countries. This is an interdisciplinary modality of patient management offering minimally invasive diagnostic and therapeutic options to often challenging and difficult neurovascular cases. [1,2] Adequate training and supervision combined with inherent ability to select appropriate patients and diseases can produce good results comparable to those in the literature, and give encouragement to the practitioner to progressively embark on a journey of learning and teaching.[2] Diagnostic angiography (DSA) is the mainstay of neurointervention. Altogether, 87 diagnostic DSA were done in spontaneous non traumatic subarachnoid haemorrhage cases. Procedure related morbidity (neurological) was seen in 1.15% of our cases. There was no puncture site related complications or no vessel injury related complications. A large series of 19,826 cases by Kaufmann et al.[3] had shown 4.2% puncture site complications, 2.63% neurologic deficits (including, 0.14% stroke with permanent disability), and 0.06% death. In yet another series of 2899 cases by Willinsky et al.,[4] there were 1.3% neurologic complications, including 0.5% permanent disability from stroke. Factors associated with complications and difficulties in DSA include increasing age, advanced atherosclerosis and complex or difficult aortic arch. All patients presented with spontaneous SAH should undergo cerebral DSA for better planning of operative procedure, open or endovascular. Even patients who are initially DSA negative, should undergo repeat DSA at a regular interval.

**SUMMARY & CONCLUSION:**

Spontaneous SAH is a neurological emergency. High index of suspicion is required for diagnosis. Despite recent advances in CTA and MRA, DSA remains the standard imaging technique for evaluation of the cerebral vasculature. Diagnostic DSA is feasible in a resource limited tertiary care hospital with procedural success rate and outcomes comparable to existing literature.

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