

RADIATION INJURY TO SCALP FOLLOWING NEURO-INTERVENTION- A CASE REPORT

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1.Introduction-

Radiation injuries are quite rare in radiology with the advent of new dose reduction technologies and clinician awareness nowadays. However there is under-reporting as well since most of the injuries are too trivial and usually at locations not directly visible to the patient. The predisposing factors may be related to the operator, the equipment or the patient. Neuro-vascular fluoroscopy guided interventional procedures are quite complex, needing frequent use of magnification modes, high fluoroscopy times and image acquisitions all of which can lead higher radiation doses unless the interventionalist is well aware of these factors and precautions are taken.

2.Objectives & Methodology-

We started following up of our interventional cases exceeding certain trigger factors, as a part of IAEA project RAS 9055 -SAFRAD (SAFety in RADiological Procedures). The following were the trigger factors for voluntary reporting under SAFRAD. ([Www.rpop.iaea.org/safrad](http://www.rpop.iaea.org/safrad))

(a).Fluoroscopy time greater than 40 minutes. (b) Kerma Air Product greater than 200 Gy.cm² (c).Cumulative dose at reference point greater than 5 Gy (d). Peak skin dose greater than 2 Gy (e). Number of series greater than 20 (f). Radiation injury from this procedure observed (g). Multiple procedures on one patient within 2 months

3.Results & Case Report-

A 46 year old, previously healthy female patient presented to the emergency neurology unit with sudden loss of consciousness in February 2011. Her CT on admission showed a subarachnoid hemorrhage with an anterior communicating artery aneurysm. A digital subtraction angiogram in February 2011 confirmed the aneurysm. Thereafter she underwent a stent assisted coil embolization for an anterior communicating artery aneurysm at the Interventional Radiology Unit in July 2011. GE Advantx single C-Arm LCA 2001 model digital subtraction Angiography unit was used. The procedure and immediate post procedure period was uneventful. 2 weeks later patient complained of loss of hair on the back of the head which gradually worsened in following 2 weeks. There was no erythema, pruritis, blistering or skin ulceration. It progressed to complete loss of hair in the involved region. The area of hairloss was rectangular shaped about 5X6 cm in size and corresponded to the shape of x-ray beam.

The affected region was treated with topical steroid cream. Regrowth of hair in the affected region was detected about 2 weeks later (6 weeks after the procedure). Complete regrowth was seen only after about 14 weeks.

This unit did not have dosimetry displays and the procedure lasted 52 minutes of fluoroscopy time with kv range of 80-120. There were 46 DSA acquisitions done during this single step procedure.

4.Patient's Images During Follow-up Period



Two weeks after the procedure



Six weeks after the procedure



Eight weeks after procedure

Technical Parameters during Procedure

Most often used projection-PA	Fluoroscopy (high mode)	-80 kV	
Total fluoroscopy time	- 52 min	Image magnification	- ZoomX2
Total procedure time	- 215 min	Focal Spot size	- 0.6
No of DSA acquisitions	- 45	Frame rate	- 6.3/s
DSA	-70 kV,320mAs	Source to II distance	- 107 cm

5.Discussion-

The epilation seen in this patient was attributed to the radiation received during this procedure as the shape of hair loss conforms to the radiation beam, its appearance two weeks after the embolization, its transient nature with complete recovery after 4 months etc. The anagen (active growth) phase follicles of scalp are highly susceptible to radiation and dystrophic hairs undergo shedding. Regrowth generally takes 3-4 months. Long term effects thought to be unlikely. (1) These effects are generally deterministic and known to occur at doses as low as 2 Gy. After a high dose procedure patient should be followed up for radiation injury and can be instructed to report if specific changes occur. Some authors suggest an increased radiosensitivity with Carbamazepine (3), though our patient had no such history. The most important measures in preventing radiation injuries are to follow radiation safety practices & effective dose management techniques always (2,4) and plan ahead to minimize radiation risk in potentially high dose procedures. (5)

References-

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