Case Report

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Endoscopic evacuation of chronic subdural hematoma with rigid and flexible endoscope: case report

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Introduction: Subdural haematoma (SDH) is a common neurosurgical condition after head trauma requiring evacuation to prevent secondary brain injury. The first choice of management in these patients is a large craniotomy or burr-hole evacuation. However, sometimes due to lack vision during drain tube insertion or irrigation the authors might land up in a complication like cortical bridging vein rupture, haemorrhage etc. Also, the management of septate chronic SDH (CSDH) with multiple neo-membranes does not have a well-defined surgical approach. Recently, endoscopic evacuation has been reported to a be a feasible method for evacuation in acute, subacute and chronic SDH patients.

Presentation of case: A 65-years-old male patient presented with a history of recent head injury and symptoms of headache and urinary incontinence of 7 days (Glasgow Coma Scale Score 15/15). Computed tomography scan revealed CSDH at both fronto-parietal convexity more on right side.

Discussion: The authors reported our initial experience on a typical case of an older patient with chronic subdural haematoma and its evacuation with the assistance of both rigid and flexible endoscope. The authors could visualize cortical bridging veins and neo-membranes intraoperatively and guided our drainage tube accordingly to avoid inadvertent haemorrhage. There was no recurrence of symptoms postoperatively. Thus we achieved apparent successful evacuation of the CSDH in this patient in a 6-month follow-up.

Conclusion: Endoscopic evacuation of CSDH proves to be an effective minimally invasive modality and more studies are required on larger patient groups with long-term follow-up imaging to confirm its superiority.

Keywords: Bridging vein, CSDH, endoscope, endoscopic removal, subdural haematoma

Introduction

Chronic subdural haematoma (CSDH) is defined as a collection of blood products under the dura, which is a common neurosurgical condition in traumatic brain injury[1]. Compression of the brain parenchyma and intracranial hypertension can be caused by incremental haematoma, which may result in clinical symptoms such as motor disturbance, gait abnormality, headache, cognitive disturbance, and aphasia[1]. The standard treatment for CSDH is surgery: twist drill evacuation, burr-hole aspiration, mini-craniotomy, and large craniotomy are some of the surgical methods to effectively remove CSDH[1,2]. However, the optimal therapeutic strategy for CSDH has remained an enigma, despite years of research. High recurrence rates up to 70% with 10–20% requiring a second surgery are a testament to this fact[3]. Although burr-hole evacuation is the most widely used technique, as it is both minimally invasive and relatively quick[1]. However, the recurrence rate of burr-hole evacuation is slightly higher than that of osteoplastic craniotomy due to limited exposure or involuntary injury[1].

Also due to lack vision during drain tube insertion or irrigation we might land up in a complication like bridging vein rupture, intracerebral haemorrhage etc. Moreover, subacute and chronic clot might not be amenable to irrigation only and may need suction under vision. Also, the management of septated CSDH with multiple neo-membranes does not have a well-defined surgical approach[2]. The neo-membranes forming septations prevent evacuation of clots through burr holes, and the small remaining loculi with clots will enlarge overtime to cause

HIGHLIGHTS

- Endoscopic evacuation can be successful in treating chronic subdural haematomas and can spare the bridging cortical vein.
- It can reduce hospital stay with lower rate of recurrence.
- This minimally invasive technique requires further study.

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Figure 1. Advantages of endoscopic evacuation of subdural haematoma over conventional neurosurgical procedures.

recurrence of the haematoma. Recently, endoscopic evacuation has been reported to a be a feasible method for evacuation in acute, subacute and chronic SDH patients in different age groups with favourable outcome [see Fig. 1] under general or even local anaesthesia with a minimally invasive small craniotomy[1–6]. It is also reported that haematoma clots, trabecular structures, and stretching of the cortical vessels, which could be found only under neuroendoscopy, were significant risk factors for CSDH recurrence[1].

Here we report our initial experience on a typical case of an older patient with chronic subdural haematoma and its evacuation with the assistance of both rigid and flexible endoscope. The patient improved after surgery and no recurrence of symptoms.

Case presentation

A 65-years-old male patient presented with a history of recent head injury due to fall from height and symptoms of headache and urinary incontinence of 7 days (Glasgow Coma Scale Score 15/15). Computed tomography (CT) scan revealed CSDH at both fronto-parietal convexity that is more on right side. [see Fig. 2] Pressure effect is evident by sulcal effacement as well midline shift to the left (about 1.12 cm). Subarachnoid haemorrhage is seen.

A CT scan after 1 month still showed the subdural haematoma [see Fig. 3] and admitted to us for neurosurgical evacuation because of aggravation of symptoms (for developing urinary incontinence).

We performed burr-hole and endoscopic evacuation of the bilateral CSDH with the assistance of both rigid and flexible endoscope [see Fig. 4].

The patient was shifted to the ward after having observation in High Dependence Unit. He was discharged at second postoperative day. [see Fig. 5] Postoperative CT scan was not done. The patient did not report any recurrence of symptoms at follow-up visits after 7 days, 1 month, 6 months and considerably well now.

The case has been reported in line with the Surgical Case Report (SCARE) criteria[7].

Discussion

We achieved an apparent successful evacuation of the CSDH in this patient with both rigid and flexible endoscope. We report here our initial experience of a typical case of CSDH. Intraoperatively, the resolution of flexible endoscope was not satisfactory to us and required us to shift to rigid endoscope, and we were successful in sparing the bridging cortical vein. Moreover, the formation of neo-membranes could resist clot evacuation if operated in conventional burr-hole craniotomy. The neo-membranes forming septations prevent evacuation of clots through burr holes, and the small remaining loculi with clots will enlarge overtime to cause recurrence of the haematoma. Our case is in line with published literature that endoscopic evacuation can dramatically reduce CSDH recurrence rates[8]. As endoscopic evacuation can be done under local anaesthesia with a small craniotomy, it may be an alternative where invasive procedures are inappropriate. It may particularly be beneficial to those patients with extreme age or with any other comorbidity where general anaesthesia is contraindicated. Also, it can decrease hospital stay as seen in our case that the patient was released in the second postoperative day.

However, this technique should not be the first choice for treating acute subdural haematomas caused by high-velocity trauma in patients with a low Glasgow Coma Scale[9]. For such patients, decompressive craniectomy and subdural haematoma evacuation should be the standard procedure[9]. Further studies on a larger patient group of different ages with different time duration of haematoma should confirm the superiority of the endoscopic procedure over conventional methods. In some cases although very rare there can be midline shift associated with chronic subdural haematoma for which computer-assisted volumetric measurement via BrainLab as well as the ABC/2 volumetric measurement. A = largest length (anterior to posterior) of the SDH; B = maximum width (lateral to midline) 90° to A; C = maximum height (coronal plane or multiplication of slices) of the haematoma can be done to guide the treatment modality and improve patient management[10]. Also, longer follow-up CT scans on a larger study population are required to confirm its efficacy of decreasing the recurrence of CSDH in patients. In terms of limitations of the endoscopic management of the CSDH the first and foremost is the learning curve of such advanced level of treatment modality which is not easy to grasp fast as it requires adequate level of dexterity and practice[11]. Along with it the duration of surgery for simple liquid haematoma being larger and the two-dimensional image also acts as potential barrier .In some cases there can also be unnecessary larger size of burr hole for uniloculated simple haematoma[12]. Another one of the major setback is also difficulty due to rapid reexpansion of the brain and insufficient space following partial decompression.Moreover there is risk of damage to the cortical surface or membrane due to rigid endoscope or by the rigid suction cannula. Nonetheless it may not be ideal for simple hypodense liquid haematoma with single cavity and large calcified clot[4,13,14]. The use of steroids has been shown to decrease the incidence of recurrence in cases of CSDH[14,15]. In cases such as large number of haematomas,

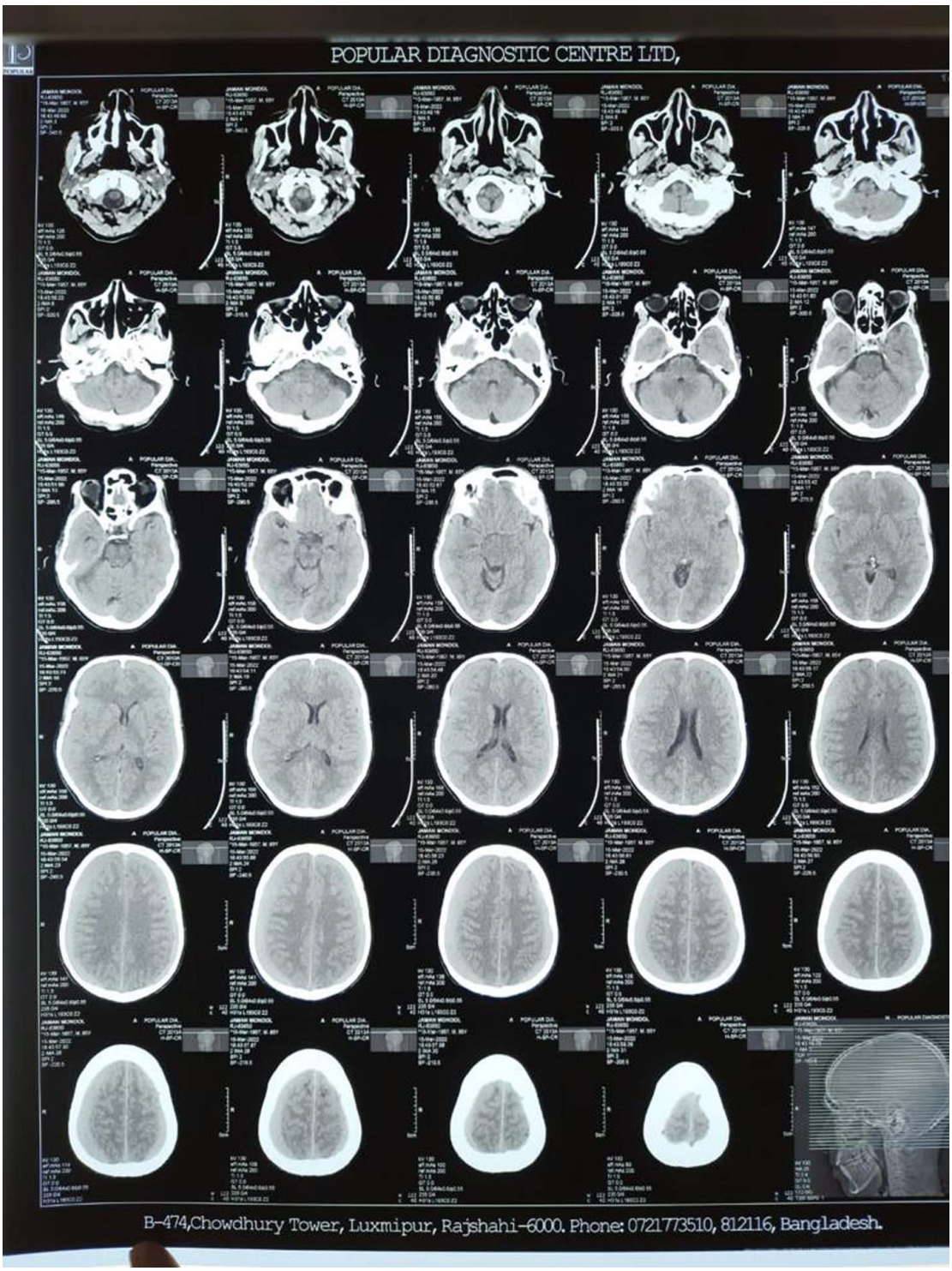

Figure 2. Initial computed tomography Scan of brain showing bilateral subdural haematoma at both fronto-parietal convexity that is more on right side. (Just after the head injury).

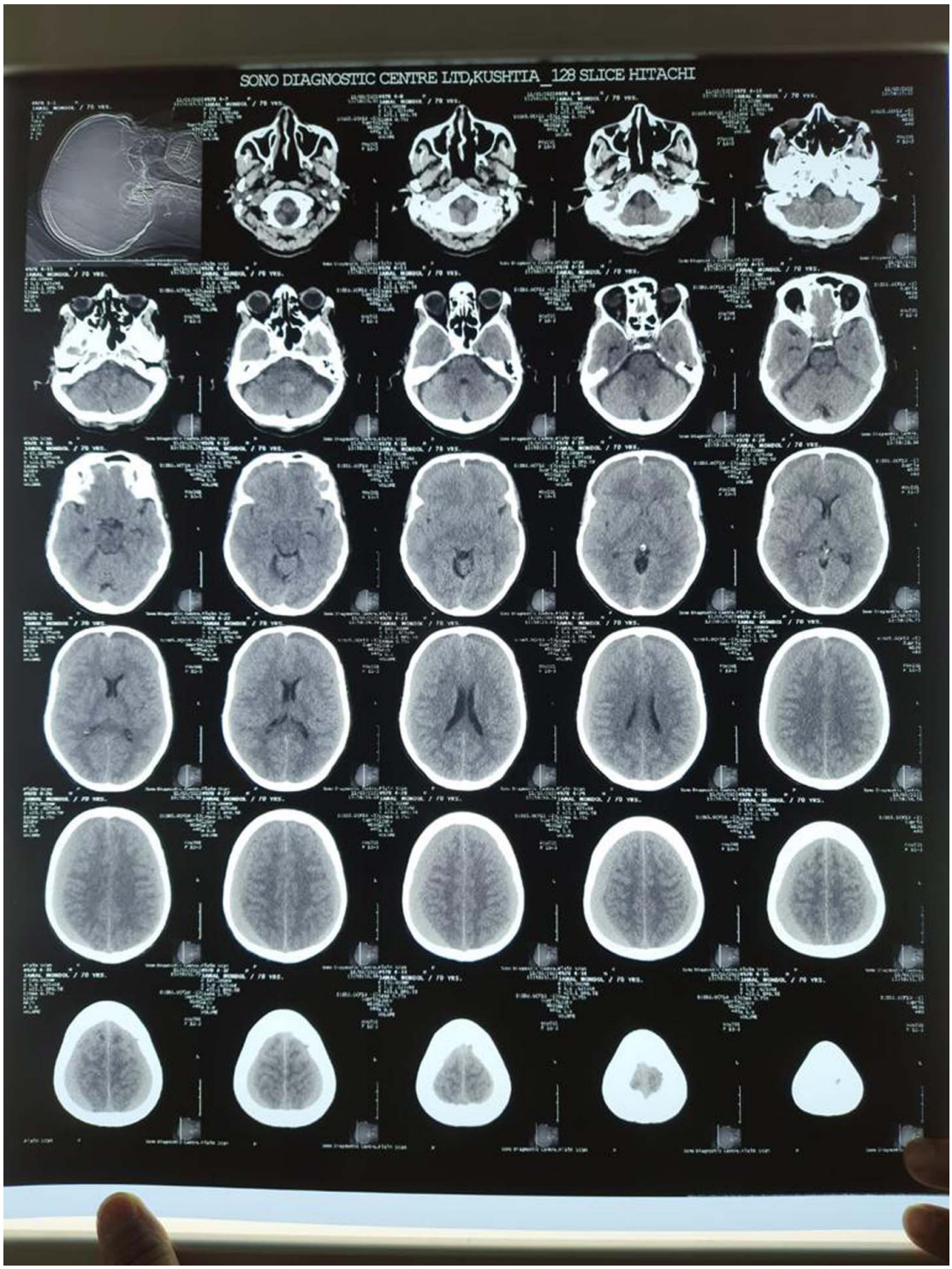

Figure 3. Computed tomography scan of the brain showing unchanged chronic subdural haematoma after 1 month.

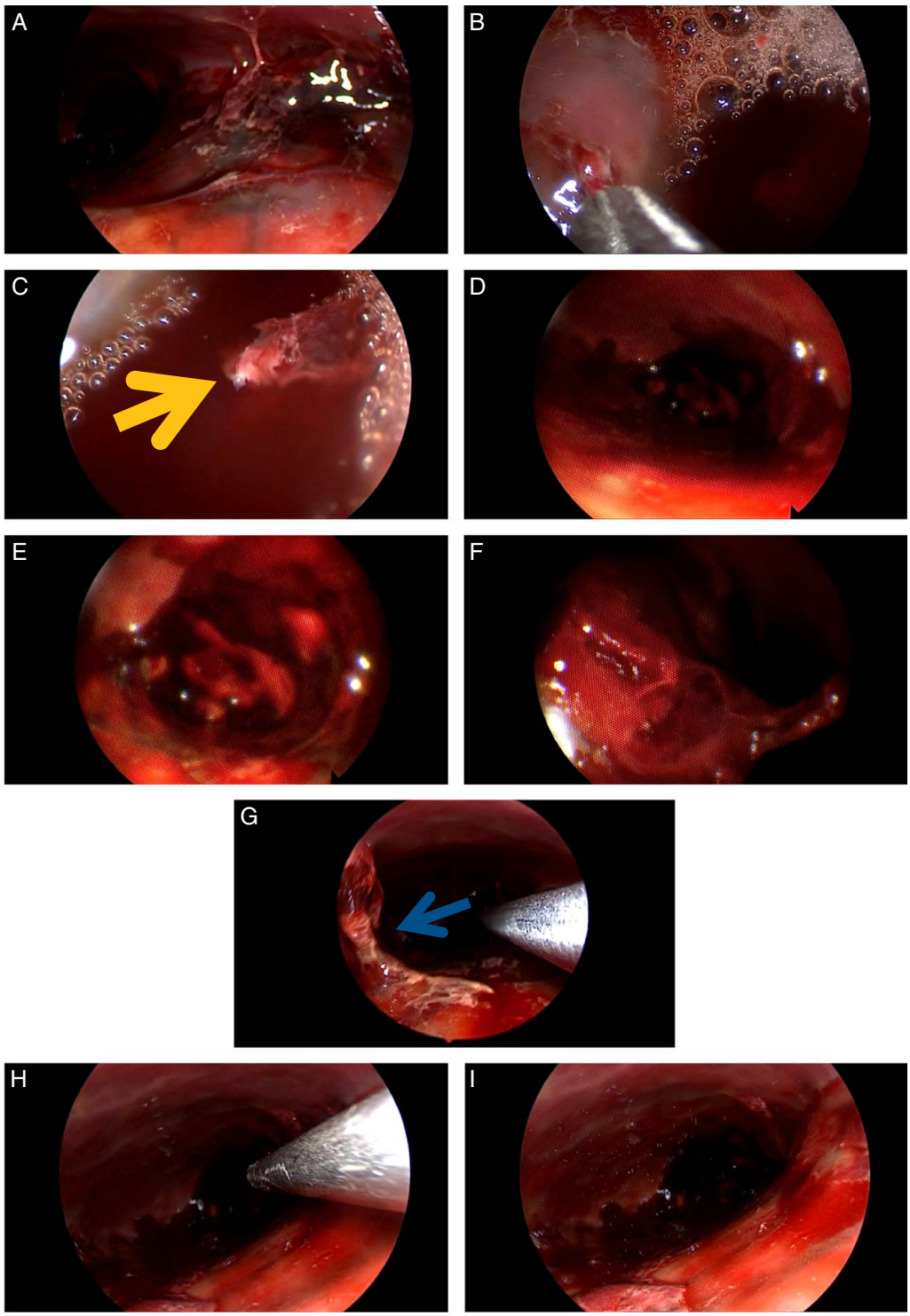

Figure 4. Consecutive intraoperative endoscopic image of the evacuation of chronic subdural haematoma with both rigid and flexible endoscope. (A–C) and G–I) were done with rigid endoscope and the rest images were taken navigating the flexible endoscope. The metallic pipe indicates drainage tube. The yellow arrow in (C) indicates formation of neo-membrane. The procedure allowed us to evacuate the haematoma sparing the bridging cortical vein (marked in blue arrow in (G)).

Figure 5. The patient's condition at second postoperative day. [Photo taken upon his consent].

bilateral haematoma, haematoma formation within the outer membrane, the amount of air in the postoperative subdural space and high and mixed density of haematomas in brain CT are associated with higher chances of recurrence[16–18].

Conclusion

Endoscopic evacuation of CSDH proves to be an effective minimally invasive modality of clot removal with better intraoperative visualization of the intracranial structures. Our initial experience with it was successful without any rupturing of the bridging vein or any further haemorrhagic recurrence in a 6-month follow-up. Finally, more studies are required on larger patient groups with long-term follow-up imaging to confirm the procedures superiority over conventional techniques.

Ethical approval

Ethics approval is not required for case reports at our institution. (Dhaka Medical College Hospital, Dhaka, Bangladesh).

Consent

It was not required. Because the patient is completely anonymized. We did not disclose patient identity. We treated it is a routine case at hospital. Now, we presented our finding in a way that the patient cannot be identified. The need for consent was waived by the Department of Neurosurgery, Dhaka Medical College Hospital. (please check the document at the end of the manuscript).

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Not commissioned, externally peer-reviewed.

Patient consent form

I certify that, since the case report is not disclosing any patient data (his name, image etc.), they do not need to obtain any consent form for publishing it. So, the need for patient consent in waived.

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