Case Report
Journal of Pierre Fauchard Academy (India Section), *Vol 35(3), DOI: 10.18311/jpfa/2021/27881, September 2021 p. 101-105*
ISSN (Print) : 0970-2199
ISSN (Online) : 2405-772X

Full Mouth Rehabilitation of Hydrocephalus Patient – A Case Report

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Abstract

Dentist's frequently encounter patients who are medically, physically or mentally compromised. One such medical condition is 'hydrocephalus'. Hydrocephalus is basically a neurological disorder caused by excessive intracranial pressure due to abnormal accumulation of cerebrospinal fluid within the ventricles or subarachnoid space of brain and raised intracranial pressure. Ventriculo-Peritoneal Shunt (VPS) is the most commonly used treatment though ventriculo-atrial shunt is also another treatment option. To maintain the intracranial pressure within normal range, the patients are kept on medications which make them more prone for dental malformations and caries. Because of the poor oral hygiene, these patients require a regular dental care. This report discusses the dental management process employed for a five years old patient having hydrocephalus.

Keywords: Handicapping Conditions, Hydrocephalus, Special Care Dentistry, Ventriculoperitoneal Shunt

1. Introduction

In our routine dental practice, medically, physically or mentally compromised patients are frequently encountered. These patients are categorized under the special care dentistry as they require oral health needs with extra care. Paediatric dentists are the ones who generally come across such cases. One such medically compromised condition is 'hydrocephalus'[1].

Hydrocephalus is a Greek phrase that means "water in the head." Excessive intracranial pressure is produced by inappropriate accumulation of cerebrospinal fluid in the brain's ventricles or subarachnoid area, resulting in increased intracranial pressure[2]. These patients often present with delayed development, visual disorders, irregular breathing patterns, bradycardia, hypertension and behavioural disturbances[3].

The most common surgical treatment for hydrocephalus is the insertion of a shunt device[4]. Patients are sometimes kept on drugs to keep their intracranial pressure within normal ranges, which makes them more susceptible to dental caries[5]. These patients require regular dental care due to their poor oral hygiene situation[6]. As a result, paediatric dentists should be well-versed in appropriate treatment strategies. Hence the aim of this article is to discuss a case of hydrocephalic paediatric patient and the modification in managing the child in the dental operatory[7].

2. Case Report

A 5yrs. old male patient came to the department with the chief complaint of pain in the right upper back tooth region since a week. While taking the medical history of

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the patient, his grandfather reported that the patient had undergone Ventriculo-Peritoneal Shunt (VPS) surgery at 18 days of age for the same. The child was operated again for VPS at 9 months of age because of shunt sepsis. The general examination revealed the normal built of the patient and an abnormal enlargement of the head (Figure 1a). An intraoral examination revealed discoloured 51, 61 due to pulpal necrosis. Patient's grandfather gave no relevant history of trauma in the anterior region of the cavity. A further examination revealed deep caries in 54 and 64 whereas; pit and fissures caries were present in 65, 74 and 85 (Figure 1b). Intra oral periapical radiographs were advised for 51, 61, 54 and 64. The radiograph confirmed the pulpal involvement of the lesion of these teeth (Figure 2).

Before planning the dental treatment, patient was referred to neurosurgeon and cardiologist for the evaluation of present medical condition. Consent was given by the medical team to perform an invasive dental treatment under local anaesthesia with antibiotic prophylaxis and protective stabilization. The patient exhibited a positive behaviour and showed good cooperation during the examination. Hence, the treatment was planned on the dental chair under the supervision of the medical team. Before starting the therapy, we palpated the position of the catheter on his neck, and a neck cushion was inserted for protection (Figure 3). With all due precautions, treatment was performed with minimal movement of the neck. The teeth with small carious lesions were restored with glass ionomer cement



Figure 1a. Preoperative. a) extraoral; b) intraoral photographs.



Figure 1b. Pre-operative Intraoral photographs - (A) Frontal view, (B) Maxillary Occlusal view, and (C) Mandibular Occlusal view.



Figure 2. Pre-treatment and post-treatment radiographs of maxillary central incisors.

on 65, 74, 85. Pulp therapy was done on 51, 61, 54 and 64. This was followed by stainless steel crown over 54 and 64 whereas 51, 61 were restored with the help of strip crowns (Figure 4).

Maintenance Instructions

Patient was instructed to brush twice a day with fluoride containing tooth paste and floss the teeth between crowns. The patient was scheduled for regular follow-up appointments for evaluation of dental hygiene, permanent tooth development and eruption, and craniofacial structural changes at regular intervals.

3. Discussion

The main concern while treating a patient with hydrocephalus is firstly to prevent the shunt sepsis and



Figure 3. Positioning of patient during dental treatment of a hydrocephalus patient with Ventriculoperitoneal shunt - (A) Frontal view, and (B) Lateral view.



Figure 4. Postoperative Intraoral photographs of patient - (A) Frontal view, (B) Maxillary view, and (C) Mandibular Ocular view.

secondly, to prevent the dislocation of the shunt system[8]. Helpin (1998)[9] conducted a 12 month follow-up research with 14 patients, to investigate the occurrence of shunt infections during dental treatments without antibiotic prophylaxis, and no shunt infections were observed[9]. However, in our case, because the patient had a history of shunt sepsis, it was imperative to begin dental therapy while on antibiotics to avoid the possibility of recurrence.

In the early stages of hydrocephalus, patients are usually treated surgically by placing a shunt device. Through a system of small tubes known as catheters, this device diverts the flow of CSF from the CNS to another part of the body, where it can be absorbed as part of the regular circulatory process, lowering intracranial pressure and preventing brain damage[7]. Excessive compression on catheter can result in issues such as incorrect position, blockage, fracture, and component migration[10].

When considering a dental treatment for shunt-treated individuals, it's critical to check the catheter's placement with palpation before proceeding[10]. The catheter is palpable in the cervical region of the neck in VPS patients and is cautiously maintained as it can get disrupted during dental treatment.

According to de Carvalho *et al.* (2013)[11], inadvertent mechanical stressors on the shunt and significant movement of the patient's head caused a catheter to migrate from the belly to the supraclavicular region in a 2 year-old infant[11]. To avoid the shunt system from dislocating, several case reports have been published in which the patient was managed on the dental chair with the use of pillows and cushions, resulting in a more comfortable and appropriate posture for the patient during dental treatment[12]. In our patient, all dental procedures were performed with a comfortable position of patient's head with neck pillow and saliva ejector so as to reduce the movement of patient neck. Kim *et al.* (2017)[10] used neck pillow and Pedi wrap during dental treatment to prevent excessive movement of neck[10]. Gallarreta *et al.* (2010)[6] recommended using pillows and cushions to help the patient maintain a more comfortable and appropriate posture during dental treatment[12].

The dental treatment of a patient with hydrocephalus can be done at the dentist's office with little variation in protocol. Because systemic illnesses are frequently connected with hydrocephalus and should be taken into account before formulating a treatment plan, it is critical to interview the patient and family and obtain a thorough history of general health.

4. Conclusion

Because of their medication intake, children with hydrocephalus have high incidence of dental hypoplasia and caries, resultant compromised oral hygiene. Caregivers should encourage their children to visit the dentist more frequently for adequate dental health that also prevents secondary infections in the body.

During dental treatment, the Ventriculoperitoneal shunt in hydrocephalus patients should not inadvertently get compressed, and customised head-rest should be used. Consent from a medical practitioner should be obtained also need for antibiotic prophylaxis should be discussed before executing dental treatment for these patients.

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