

# Polytetrafluoroethylene Sponge Syringosubarachnoid Shunt

## Politetrafloroetilen Spanç Sirengosubaraknoid Şant

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### ABSTRACT

Syringomyelia is condition in which a cyst or cavity forms inside the spinal cavity. Its management always remains a difficult. A variety of surgical techniques have been used in management of syringomyelia. Syringosubarachnoid shunt remains an effective method in management of syringomyelia. Shunt tube obstruction remains an important complication of shunt procedure. We describe a novel technique of use of polytetrafluoroethylene sponge shunt for syringosubarachnoid shunt in patient with large syrinx and Chiari 1 malformation. Polytetrafluoroethylene sponge is a non irritant material with multiple porosities that is less susceptible to blockages or kinking. It could provide a good alternative technique in syringosubarachnoid shunting.

**KEYWORDS:** Chiari malformation, Syringomyelia, Syringosubarachnoid shunt, Polytetrafluoroethylene sponge

### ÖZ

Sirengomyeli spinal kavitenin içinde bir kist veya kavite oluşması durumudur. Tedavisi her zaman zordur. Sirengomyelinin cerrahi tedavisinde çeşitli teknikler kullanılmıştır. Sirengosubaraknoid şant sirengomyeli tedavisinde etkin bir yöntemdir. Şant tüpünün tıkanması şant işleminin önemli bir komplikasyonudur. Büyük bir sirenks kavitesi ve Chiari malformasyonu olan bir hastada sirengosubaraknoid şant için politetrafloroetilen spanç şant kullanılan yeni bir tekniği tanımlıyoruz. Politetrafloroetilen spanç tıkanmaya ve katlanmaya daha az maruz kalan multipl delikli iritan olmayan bir materyaldir. Sirengosubaraknoid şantta iyi bir alternatif teknik sağlayabilir.

**ANAHTAR SÖZCÜKLER:** Chiari malformasyonu, Sirengomyeli, Sirengosubaraknoid şant, Politetrafloroetilen spanç

### INTRODUCTION

Chiari 1 malformation with syringomyelia has been commonly treated with foramen magnum decompression and syringosubarachnoid shunt. Shunt tube obstruction remains an important complication of shunt procedure. Polytetrafluoroethylene sponge is a non irritant material with multiple porosities that is less susceptible to blockages or kinking. We report a case of syringomyelia in which polytetrafluoroethylene sponge was used in syringosubarachnoid shunting.

### CASE REPORT

A 34-year-old female was referred to our institute with progressively increasing dysesthesia in both upper extremities and imbalance on walking since four years. Neurological examination revealed, dissociate sensory loss on upper limbs with increased tone in lower limbs. Power was grade 5/5 in all four limbs. Magnetic resonance imaging of the spine was obtained which revealed cerebellar tonsillar herniation below foramen magnum with large syrinx extending from C2 to D2 level (Figure 1). The patient underwent foramen magnum decompression and syringosubarachnoid shunting with



**Figure 1:** Magnetic resonance imaging of cervical spine sagittal section showing cerebellar tonsillar herniation below foramen magnum with large syrinx extending from C2 to D2 level.

polytetrafluoroethylene sponge from C5-C6 laminectomy. The patient was positioned in the prone position and underwent foramen magnum decompression with removal of the occipital bone around the foramen magnum. Laminectomy was performed at C5- C6 level where the syrinx was the largest. An incision was made in the posterior aspect of the dura and arachnoid membrane. Myelotomy of approximately 2 mm was made posteriorly in the midline. A long polytetrafluoroethylene sponge sheet was inserted from the myelotomy into the syrinx cavity and the distal end placed in the subarachnoid space (Figure 3). Post operatively the patient showed significant improvement in spasticity in lower limbs and dysesthesia in hands. The patient has been in follow up since one and half year and has been gradually improving in symptoms. Post operative magnetic resonance imaging revealed shows resolution of syrinx cavity (Figure 2).

### DISCUSSION

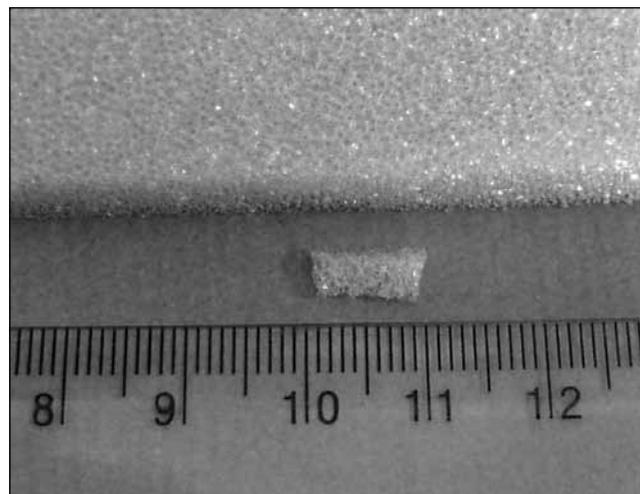
A spectrum of operative techniques has been used in the management of syringomyelia (8). Syringomyelia can be challenging to treat successfully even in the most experienced hands. Operative techniques of syringomyelia range from posterior fossa decompression to diversion of cerebrospinal fluid. Diversion of cerebrospinal fluid may be in form of ventriculoperitoneal shunt or more direct methods like syringosubarachnoid shunt and syringostomy. Distant shunts like syringoperitoneal, syringopleural and syringocisternal shunts may be undertaken if foramen magnum decompression and syringosubarachnoid shunt is not adequate.

Even though foramen magnum decompression is an effective treatment option syringosubarachnoid shunt is a direct method of deflating the syrinx. Syringosubarachnoid shunt has not been shown to cause new symptoms of deterioration that result from Chiari malformation (4,5). Also syringosubarachnoid shunt has demonstrated rapid improvement in preoperative symptoms, particularly, pain relief, better than that by foramen magnum decompression (3). We primarily have used syringosubarachnoid shunting for patients with large syrinx in the widened spinal cord along with foramen magnum decompression.

Various techniques have been used in syringosubarachnoid shunt. Classic ventricular catheters (e.g., Pudenz or Holter type) are commonly used for syringosubarachnoid shunting. These are large catheters; hence some have suggested longitudinally-spliced ventricular catheters to decrease the bulk. T-catheters are slightly smaller but are suitable only for extraspinal shunting. Postoperative problems with shunt are shunt occlusion, shunt infection, and postshunt arachnoid scarring (1,6,7). Despite these drawbacks, shunting offers the advantages of instantaneous drainage and a straightforward technique. We describe the use of polytetrafluoroethylene sponge in syringosubarachnoid shunt; its use in syringomyelia shunting has not been described before. Polytetrafluoroethylene is an ideal material for use in intracranial procedures due to its non-absorbable and non-



**Figure 2:** Post operative magnetic resonance image showing resolution of syrinx cavity.



**Figure 3:** Polytetrafluoroethylene shunt.

reactive nature. This has been widely used in microvascular decompression surgery. Use of polytetrafluoroethylene sponge in arachnoid cyst surgery for internal cyst-subarachnoid shunt has been described (2). The multiple porosities in the polytetrafluoroethylene sponge have been shown to be advantageous over a single tube shunt that is more susceptible to blockages or kinking. Hence it may be reasonable to expect lesser incidence of shunt block with this procedure. Also as the polytetrafluoroethylene sponge is inserted through the small myelotomy the sponge remains secure and no need of suture to fix the sponge is required. Although large series of cases may be needed to study the

efficiency of the procedure, the successful result in this patient shows that polytetrafluoroethylene sponge could provide a good alternative technique for syringosubarachnoid shunt in syringomyelia.

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