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Intracranial subdural empyema in intravenous drug users – A rarest complication

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In intracranial drug users (IVDU), there are case reports of spinal subdural empyema. However, there is single case report of intracranial subdural empyema in IVDU. Why is it rare? We report second case and its analysis pertaining to our case. Case Description: a 26-years male, chronic IV drug abuser of impure opium ("Chitta"), HCV positive, presented with altered sensorium. CT head revealed subdural collection right side with 11 mm shift. We did right side hemicraniotomy and evacuated pus. Postoperatively he recovered well. Conclusions – Subdural empyema can occur due to bacteremia, infective endocarditis. In IVDU, presence of HCV infection may predispose to intracranial subdural empyema.

Keywords: IV drug user, subdural empyema, opioid, HCV, Diacetylmorphine

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Внутричерепная субдуральная эмпиема у потребителей внутривенных наркотиков: очень редкое осложнение

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В литературе встречаются описания клинических случаев субдуральной эмпиемы спинного мозга у потребителей внутривенных наркотиков (ПВН). Однако описан всего один случай внутричерепной субдуральной эмпиемы у ПВН. Почему это осложнение такое редкое? В статье описан второй такой случай и представлен анализ литературы. Описание случая: мужчина, 26 лет, хронической потребитель загрязненного опиума («читта»), позитивный по гепатиту С, был доставлен в больницу с нарушением сознания. Компьютерная томография показала субдуральную массу справа со смещением тканей головного мозга на 11 мм. Была проведена правосторонняя гемикраниотомия с эвакуацией гноя. Постоперационное восстановление происходило без значительных осложнений. Заключение: субдуральная эмпиема может развиться в результате бактериемии, инфекционного эндокардита. У ПВН гепатит С может усиливать предрасположенность к развитию внутричерепной субдуральной эмпиемы.

Ключевые слова: потребитель внутривенных наркотиков, субдуральная эмпиема, опиоид, гепатит С, диацетилморфин

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BACKGROUND

Intracranial subdural empyema is a life-threatening infection, which requires aggressive management. Young adult males are the most commonly affected [1]. The common causes are local spread of infection from ear or paranasal sinuses, post-meningitis sequelae, trauma, immunocompromised status and iatrogenic [1, 2]. In Intravenous drug users (IVDU), various CNS complications are reported like cerebral abscess, meningitis, spinal subdural empyema and osteomyelitis [3–5]. The spinal subdural empyema is a quite common complication in IVDU [4, 5]. However, intracranial subdural empyema

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in IVDU is reported once, which was associated with osteomyelitis [6]. We are reporting second case of intracranial subdural empyema and giving probable hypothesis for its occurrence in this case.

CLINICAL CASE

A 20 years old male, known IVDU and tobacco smoker, occasional alcoholic was brought in altered conscious state. He was regularly using intravenous "Chitta" (diacetylmorphine or adulterated form of heroin) for 2 years. On examination, he was drowsy, moving limbs on pain and speaking incomprehensible speech. Both forearms and legs veins had puncture marks and evidence of thrombophlebitis. There was no external mark of injury over scalp. His pupils were normal size and reactive. His sensory-motor examination was not possible due to deranged mental status. Emergency doctor suspected drug overdose. Psychiatry consultation was taken and treatment was started. He deteriorated further and developed right side anisocoria with GCS (Glasgow coma scale) E1V1M5.

MRI brain showed right side chronic subdural collectionwith right frontal gliosis and 11 mm midline shift (Fig. 1) without any fracture, osteomyelitis, sinusitis. His blood investigations revealed raised TLC count (14000/mm^3), raised liver enzymes (SGOT – 350 U/L, SGPT – 412 U/L) and he was HCV positive. Along with subdural collection, he had hepatitis. Ultrasound abdomen was planned after surgery. We planned emergency burr hole evacuation after informed consent.

We made frontal and parietal burr hole. Frank pus came out after dural incision. Decision was revised and right fronto-temporo-parietal craniotomy and complete evacuation was done after fresh informed consent (Fig. 2).

Right frontal lobe pole was having gliosis with pus flakes, looking like ruptured abscess. There were no signs of osteomyelitis of bone. Infected dura was excised and lax duroplasty was done using galea. Bone was fixed and skin and muscles were closed in layers. The adhered membrane was removed (Fig. 3).

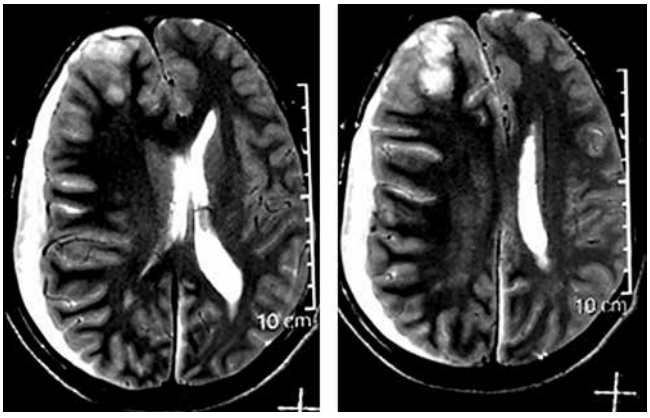

Fig. 1. MRI T2 brain showing right subdural collection, mass effect and right frontal gloss (red arrow)

Рис. 1. Магнитно-резонансная томография головного мозга в режиме Т2. Субдуральное скопление справа, масс-эффект и яркое пятно в области лобной доли справа (красная стрелка)

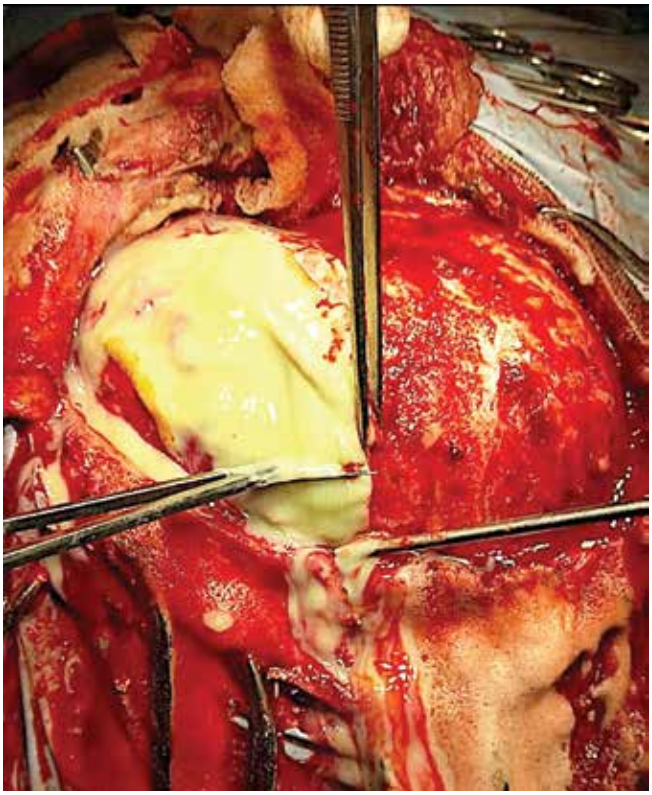

Fig. 2. Intraoperative picture showing copious amount of thin pus drained after opening dura

Рис. 2. Интраоперационная фотография. Значительный объем жидкого гноя эвакуирован после вскрытия твердой мозговой оболочки

In postoperative period, injection vancomycin 3 g, ceftriaxone 2 g, amikacin 1 g and metronidazole 1.5 g were injected daily. The gastroenterologist prescribed ursodeoxycholic acid 300 mg for hepatitis (ultrasound proven). Postop NCCT head showed complete evacuation and right frontal edema (Fig. 4).

Pus culture-sensitivity revealed Staphylococcus aureus, sensitive to vancomycin and ceftriaxone. Metronidazole and Amikacin were stopped and rest antibiotics were given for 21 days. He was extubated on 4th day, mobilized on 6th day and his power improved upto 4+ (MRS grade). The delay in recovery was partially due to chronic opioid abuse. The ceftriaxone was used under liver enzyme monitoring. There were no signs of meningitis. On 14th day, his TLC was 9500/mm^3 and liver enzymes decreased (SGOT – 150 U/L, SGPT – 168 U/L). On 22nd day, he was discharged on levetiracetam 1 g, painkillers, ursodeoxycholic acid and antacids.

He is in regular follow up for last 3 years. After rehabilitation program, he stopped all kind of abuses. He had three episodes of seizures after missing levetiracetam, which were controlled. He is a laborer by occupation for last 2 years.

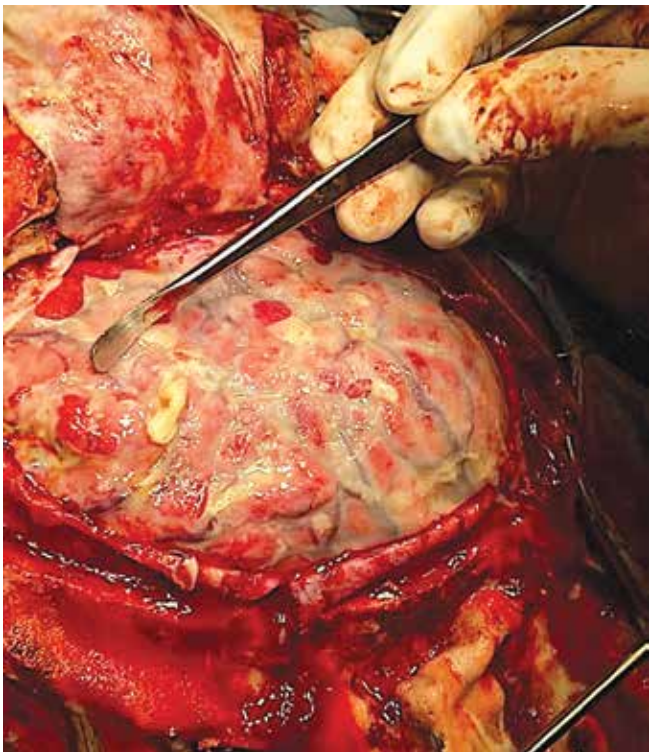

Fig. 3. Intraoperative picture showing lax brain after draining pus and removal of pus flakes and membrane

Рис. 3. Интраоперационная фотография. Головной мозг после полного удаления гноя и мембраны

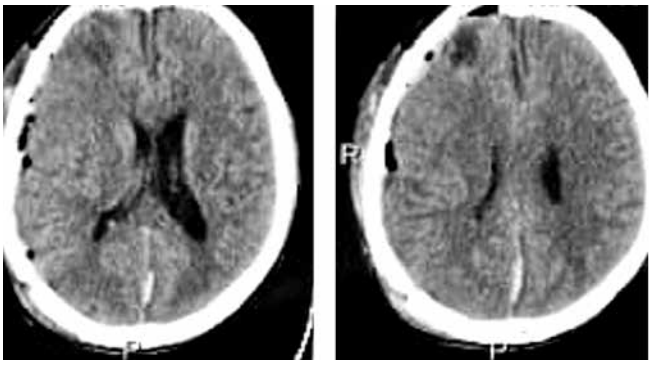

Fig. 4. Postoperative CT head axial cut showing decrease in midline shift, air pockets in subdural region and no collection

Рис. 4. Постоперационная компьютерная томография, аксиальная проекция. Уменьшение смещения центральных структур, воздушные карманы в субдуральной области, отсутствие гноя

DISCUSSION

In India, as per UN report, 1 million heroin addicts are registered, and unofficially, there are as many as 5 million [7]. The numbers of heroin addicts or "Chitta" are increasing. "Chitta" is a impure form of heroin, scientifically known as Diacetylmorphine [7]. It can be inhaled or injected. Its use in Punjab state is at alarming level. Our patient was from a village near Punjab border.

The IVDUs, especially opioid abusers, can develop multiple CNS complications, like encephalopathy, neuromuscular disorders, seizures, spine disorders, strokes, CNS infections and movement disorders [3–5, 8]. IVDUs have tendency of using unsterile needles, multiple uses and sharing needles among themselves. It leads to spread of blood born viruses like HIV/HBV/HCV. Our patient had HCV hepatitis.

This unhealthy practice of using needles can also result into septic emboli formation due to inoculation of skin and others blood's bacteria inside user's blood while puncturing. Septic emboli can migrate to different organs and cause abscess or empyema. Spinal subdural empyema is a known complication due to septic emboli. However intracranial subdural empyema is reported once in IVDU. Due to low sample size, there is no definitive answer why cranial subdural empyema is not found in IVDU. The probable reason could be "Blood Brain Barrier". Then why our case had intracranial subdural empyema? The probable answer was presence of "HCV infection" and bacterial endocarditis. HCV is reported to cause endothelial injury of blood brain barrier and thus leads to penetration of barrier [9]. We hypothesise that septic emboli or bacteremia entered into intracranial subdural space and frontal lobe parenchyma due to damaged endothelial cells as a result of HCV infection and resulted into frontal lobe abscess which ruptured into subdural space and resulted into empyema in our case. Reporting of more cases in future might prove/disprove our hypothesis.

Subdural empyema can be dealt by both surgical evacuation and medical management or medical management alone [1, 4, 6, 9, 10]. Surgery is indicated in case of mass effect or no response on antibiotics. Our case had mass effect and progressive deterioration, that's why surgical decompression was done. Large craniotomy and complete evacuation is preferred over burr holes, in case of adults [9, 10]. It is because with wide exposure evacuation, septa and membrane excision can be done in a better way. In postoperative period, antibiotics are recommended 3 to 6 weeks [4, 6, 9, 10].

Rehabilitation is very important in case of opioid abusers. Our patient was kept at rehab centre for 6 weeks and properly treated by dedicated team of gastroenterologist, psychiatrist and psychologist. After discharge, his family actively took care of him for first 12 months. After that, he started work. Inclusion in mainstream work lead to motivation and purpose.

Overall prognosis of subdural empyema is good, if dealt early. Due to capsulated nature of infection, sepsis is uncommon [9, 10].

CONCLUSION

Cranial subdural empyema in a IVDUs is extremely rare, reported only once. In IVDU, presence of HCV infection may predispose to intracranial subdural empyema. However large-scale studies and more reports are needed to verify it. Our paper is reporting unique correlation of presence of HCV and increased cranial complications in IVDU. To get best outcome in IVDUs, rehabilitation is as important as early intervention.

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Ishu Bishnoi: concept, design, review of literature, writing, editing, data collection;
Rahul Midha: literature review, proof reading, picture editing, data collection;
Sheikhoo Bishnoi: patient evaluation, data collection, proof reading;
Bansi Lal: esign, proof reading, editing.
Вклад авторов
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Rahul Midha: обзор литературы, проверка текста, редактирование изображений, сбор данных;
Sheikhoo Bishnoi: осмотр пациента, сбор данных, проверка текста;
Bansi Lal: разработка дизайна исследования, проверка и редактирование текста.

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