Case Reports

Cannabis Abuse in Patients Presenting for Pneumothorax Surgery

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Abstract

Inhaled cannabis (marijuana) use is generally associated with lung injury although a direct causal relation to lung bullae and recurrent pneumothoraces is yet to be established. Although its use in the UK is believed to be reducing, cannabis remains the most commonly used drug among adults aged 16 – 59 years, especially in the bigger cities. We sought to determine the frequency of cannabis use among patients referred for pneumothorax surgery.

Key words: *Cannabis, pneumothorax.*

Introduction

Although studies have demonstrated that tobacco smoking is associated with an increased risk of developing a spontaneous pneumothorax, the association of cannabis smoking remains controversial and unclear **[**1–3**]**. Cannabis remains the most commonly used drug among adults aged 16 – 59 years, especially in the bigger cities. Most studies looking at a causative link between cannabis and

spontaneous pneumothorax are either case reports or small case series unable to draw general conclusions [4, 5]. This study aimed to determine the frequency of cannabis use in patients referred for surgery for a primary spontaneous pneumothorax and their outcomes compared to the patients with no history of cannabis use.

Materials and Methods

157 Patients referred for pneumothorax surgery were retrospectively analyzed for a history of use of cannabis between January 2014 – December 2019 (5 years).

Methods

Perioperative data were obtained from the prospectively collected departmental database. Follow-up (including survival) data was validated from national EPR (Electronic Patient Records) linked to our system. The study population was divided into two groups based on whether they had used cannabis or not. Statistical tests were performed using SPSS (version 21, IBM corp.)

Peri-operative protocols

Standard protocol-based preoperative assessments and tests were performed including Comprised Tomographic (CT) Scan and up-to-date chest radiograph (**Fig 2**). Post-operative care is standardized using protocol-based analgesia, physiotherapy, mobilization and drain management. Follow-up after discharge was organized at 2 weeks with subsequent discharge to a local physician with advice (pneumothorax recurrence) and offer to organize counseling for cessation of smoking including cannabis.

Techniques

Video-Assisted Thoracoscopy (VATS) is the preferred approach using 1,2 or 3-ports depending on the individual case. Closure of air leak/ bullectomy or apicectomy was performed using an articulator stapling system (either Endo GIA, Autosuture, Tyco Healthcare, Connecticut, USA or Echelon Flex Endopath, Ethicon, Cincinnati, Ohio) depending on surgeon preference. (**Fig3**)

For clinical presentations of primary spontaneous pneumothorax in absence of significant underlying lung abnormalities on CT, a pleurectomy or abrasion pleurodesis was performed. For significant underlying bullous disease or partial recurrence, chemical pleurodesis was preferred.

Results

During the 5 years of the study 157 patients were admitted with their first spontaneous primary pneumothorax. They were subdivided into two groups; Group A (No declared history of cannabis use) and Group B (history of cannabis use) **Fig1** and are outline in **Table 1**.

The mean age at first presentation was lower in Group B (34 vs 38, p = 0.002). There was a significantly higher male prevalence in the cannabis users (92.3 vs 76.1, p = 0.02). The rates of tobacco use were also significantly higher in the cannabis group (85.2 vs 59.1, p = 0.02). There was no significant difference in the surgical approach in both patient groups.

There was a lower rate of postoperative complications (such as infection) in the cannabis group (0 vs 5.1, p = 0.007). All other post-operative outcomes were comparable between both groups.

There was a marked increase in the percentage of patients presenting with a spontaneous pneumothorax with a background history of cannabis use as depicted n **Figure 1**.

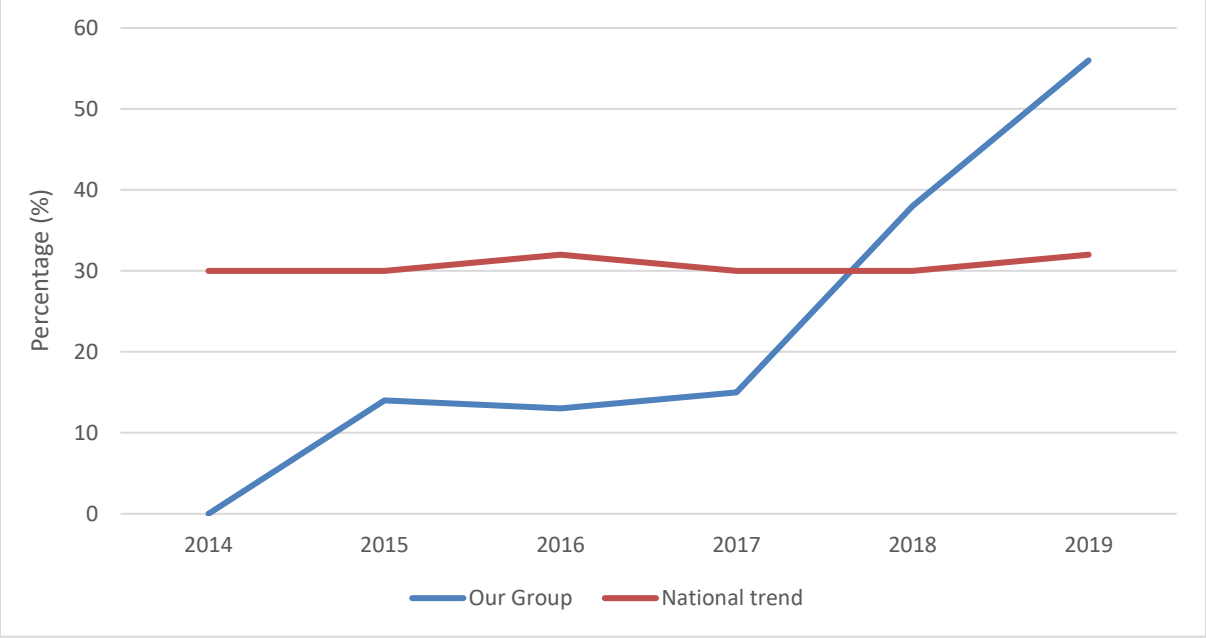
Table 1

Cannabis Use:	**Group A (NO)**	**Group B (YES)**	**"p" value**	**Inference**
N (%):	118 (75)	39 (25)		
Pre-Operative				
Mean age (SD) years:	38 (18.6)	34 (11.3)	0.002	S
Male (%):	74.6	92.3	0.02	S
BMI:	22.6	21.2	0.03	S
Tobacco Smoking (%)	59.1	85.2	0.02	S
Operative data				
Urgent/ Emergent (%)	48.3	54.5	0.52	NS
VATS (%)	99.2	94.7	0.09	NS

Post-Operative				
In-hospital Mortality (%)	0	0	-	-
Post-Operative Complication (%):	5.1	0	0.007	S
Air Leak >7 days (%):	5	0	0.007	S
LOS (median days):	6	5	0.15	NS
Re-op for Ipsilateral Recurrence (%)	2.5	5.1	0.42	NS
Staged Bilateral Procedures (%)	4.2	0	0.19	NS
Late Mortality (%)	4.2	0	0.19	NS

VATS: Video Assisted Thoracoscopic Surgery; S: Signfiicant; NS: Non-significant; LOS: Length of stay, SD: standard deviation.

Figure 1: Prevalence of cannabis use in patients presenting with first spontaneous pneumothorax



Cannabis Indica

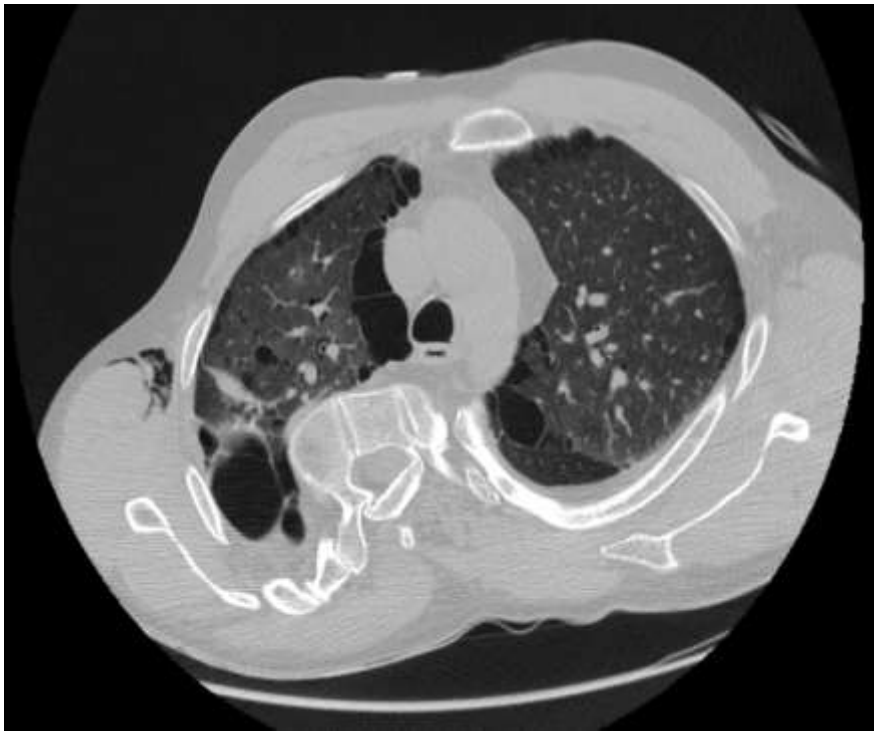


Figure 2. CT of Bullae & pneumothorax

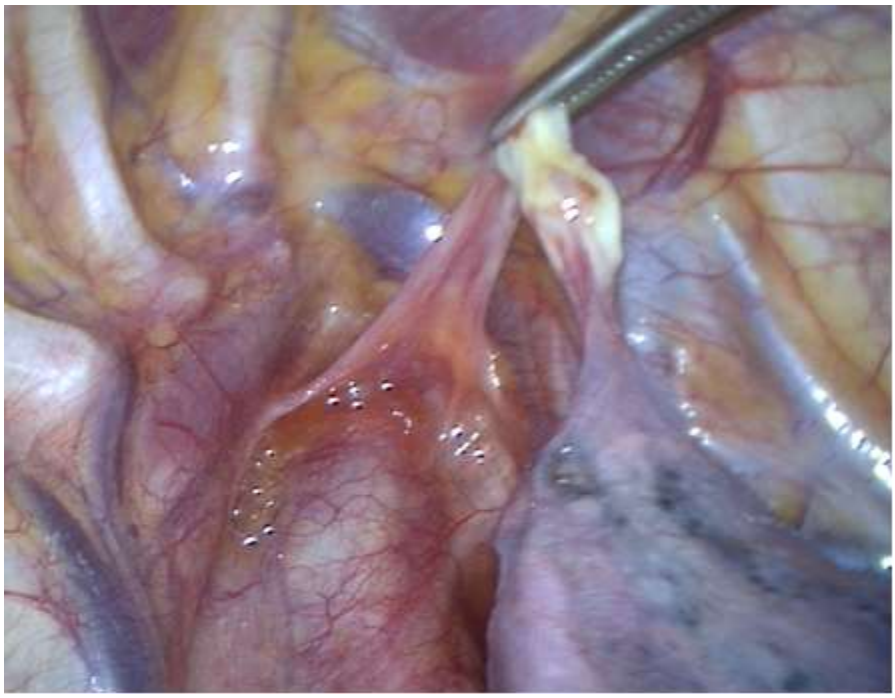


Figure 3. VATS view of Bulla & adhesion

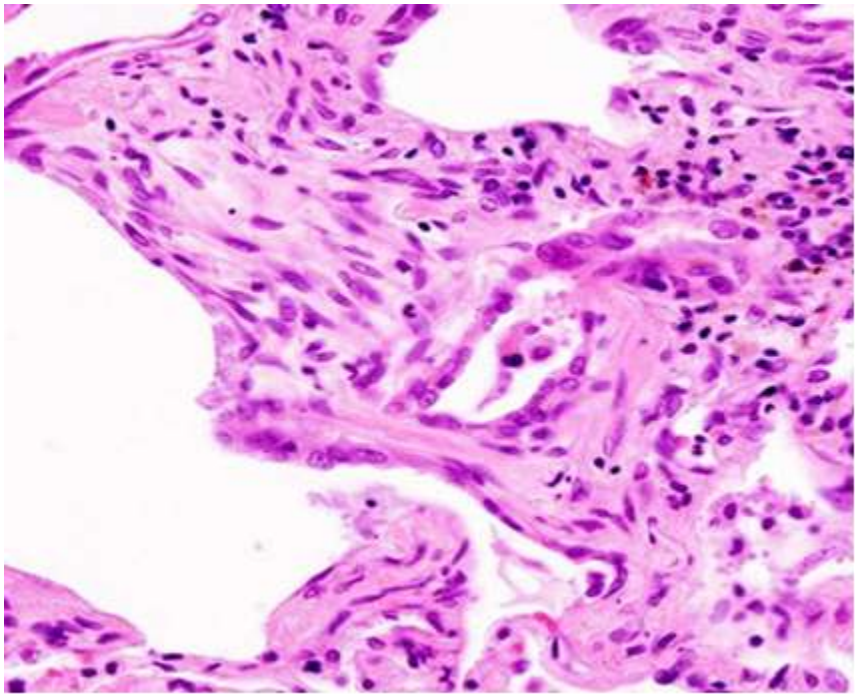


Figure 4. Histology

Discussion

Our study included a population of 157 patients who presented with the first-time spontaneous pneumothorax. The demographics of our two groups demonstrated a significantly younger age in the cannabis users. This is largely commensurate with the increasing use of cannabis in the lower age groups found worldwide and is the most common recreational drug use in the age group between 20-40 years. Although spontaneous pneumothoraces are traditionally found in the younger lean males, there was a significantly larger percentage of patients who were male in the cannabis group. This again reflects the demographics of cannabis users in the general population.

Tobacco smoking was also significantly higher in the cannabis group and generally much higher than the general population when comparing both groups. These results are not surprising given that previous studies have shown that there is indeed an association between tobacco smoking and pneumothorax **[**1, 2**]**. Both groups found a very strong association between tobacco smoking and pneumothorax; Bense et al found an almost 22-fold increase in the relative risk in males who smoke as well as a dose-response relationship. It must be noted, however, that many patients who smoke cannabis also smoke tobacco and the results may be confounding each other. The addition of cannabis to tobacco smoking may increase the risk of pneumothorax, although some studies mention that isolated cannabis smokers may have a protective effect in preventing pneumothorax **[**6**]**.

The operative strategy used in both cohorts was similar and a VATS approach was used to inspect and treat the underlying pathology (Fig4). There was a higher rate of complications, such as chest infection in the non-cannabis group. This may reflect the fact that the underlying pathology in this group is often varied and due to several different causes. The non-cannabis group also had a higher rate of air leaks post-operatively. We speculate that this may be due to other factors such as a higher age group, and other concomitant comorbidities. The cannabis group was generally young fit and otherwise healthy compared to the non-cannabis group.

Conclusion

Our study is limited by its small sample group and retrospective nature and the inherent recall bias of patients. In conclusion, we noticed an increasing prevalence of cannabis use in a patient presenting with a first-time pneumothorax referred for surgery. However, any conclusions with regards to outcomes must not be generalized as it is difficult to conclude these small retrospective studies. Further studies looking into cannabis use and pneumothorax are warranted.

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