

Intrapulmonary Migration of Implanon Requiring Thoracotomy and Pneumonotomy

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Case Report

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Abstract

- **Background:** The Implanon (subdermal contraceptive implant) is a widely used, highly effective long-acting reversible contraceptive. While local complications at the insertion site are common, intravascular migration to the pulmonary vasculature is an extremely rare and potentially severe complication. Only few cases exist in the literature regarding these rare complications.
- **Case Presentation:** A 27-year-old female presented to a tertiary hospital following a failed removal attempt of an Implanon device inserted three years prior in her left arm. The implant was non-palpable. A computed tomography (CT) scan of the chest revealed the migrated implant localized within the left lower lobe of the lung. The patient underwent a left thoracotomy and pneumonotomy to successfully remove the device. Her postoperative course was uneventful and smooth.
- **Conclusion:** This case highlights the importance of proper insertion techniques and immediate localization if an implant becomes non-palpable. Clinicians should maintain a high index of suspicion for intravascular migration when an implant cannot be located locally, and multidisciplinary surgical intervention can achieve excellent outcomes.

Keywords: contraception, foreign body migration, Implanon, arm

Introduction

Subdermal contraceptive implants, such as Implanon, are highly effective and generally safe. An Implanon is composed of a malleable, single rod measuring 4 cm long and 2 mm thick that slowly and continuously releases a form of progesterone (68 mg etonogestrel for a period of 3 up to 5 years. As standard, it is introduced subdermally, 8 cm upward from medial humoral epicondyle in the dominant arm. After this period, it is removed by minimal surgical incision.

Common complications include insertion-site infection, minor bleeding, and deep local insertion making removal difficult. However, distant migration-specifically into the venous system and subsequent embolization to the pulmonary arteries-is a rare event, estimated to occur in approximately 1.3 per one million insertions.

This migration is typically hypothesized to occur due to inadvertent deep placement directly into the basilic, brachial, or cephalic veins, or via subsequent erosion into a local vessel. We report a rare case of a 27-year-old female whose subdermal implant migrated into the left lower lobe of the lung and was successfully retrieved via thoracotomy.

Case Presentation

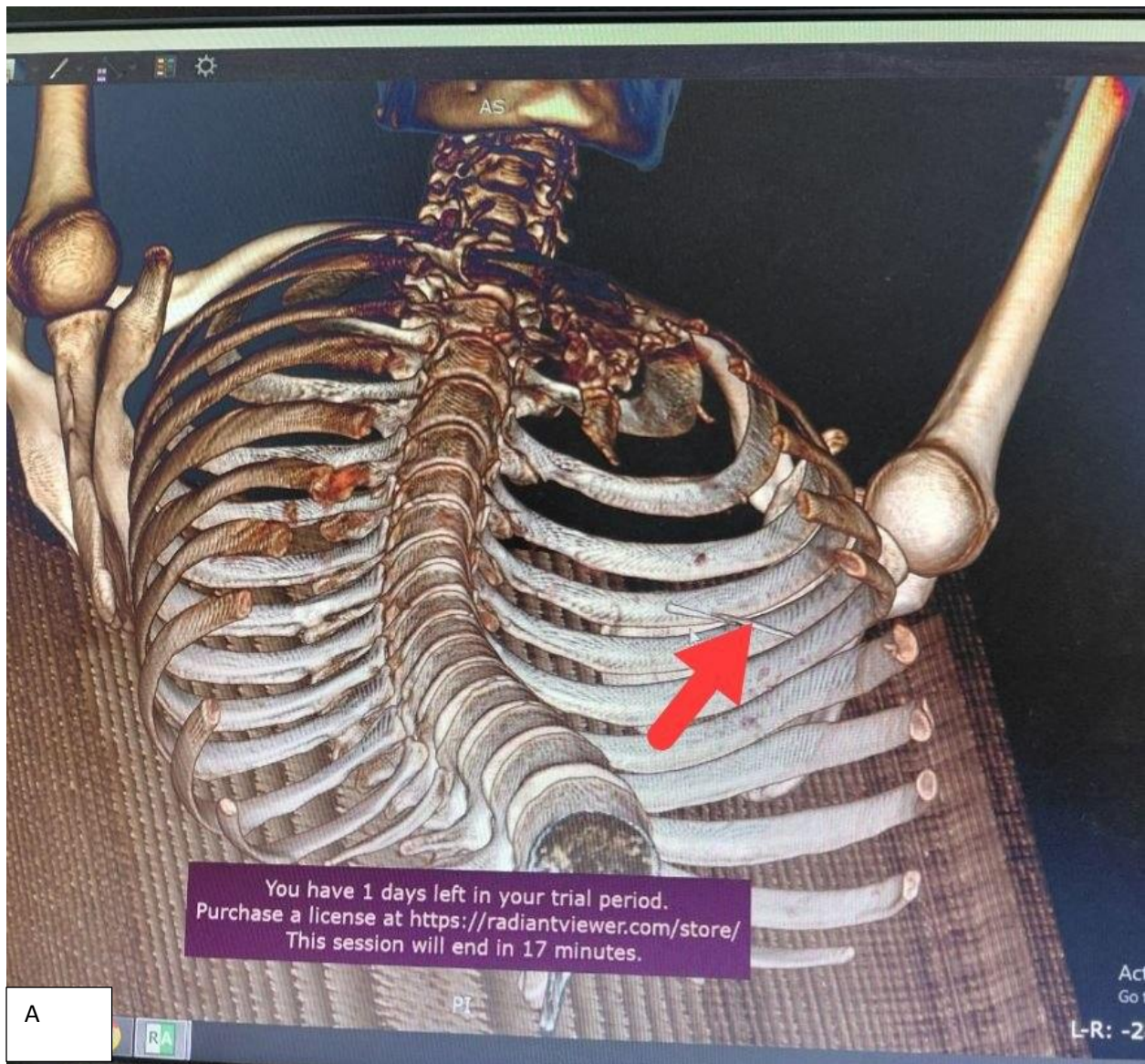
Patient Information & History

A 27-year-old female presented to our tertiary hospital following a referral from a primary health facility. Three years prior, she had contraceptive implant (Implanon) inserted into her left upper arm. Apart from mild chest discomfort she denied cough, shortness of breath hemoptysis and hand numbness. As she desired the cessation of contraceptive effect, she visited her local clinic for routine removal. However, upon clinical evaluation and trial, healthcare providers were unable to palpate or locate the device, prompting her referral for specialized evaluation.

Clinical and Diagnostic Findings

On physical examination at our facility, the patient was hemodynamically stable. Left arm inspection revealed a well-healed insertion scar and a healing incision from the prior failed extraction attempt. No palpable mass, localized tenderness, or cords were identified. Neurovascular assessment of the left upper limb was completely normal. Chest auscultation revealed clear, symmetric vesicular breath sounds bilaterally.

Given the suspicion of deep localization or migration, a Computed Tomography (CT) scan of the chest was performed. The imaging revealed a hyperdense, rod-like structure measuring approximately 4 cm, localized within the pulmonary vasculature/parenchyma of the **left lower lobe** (Figure 1).



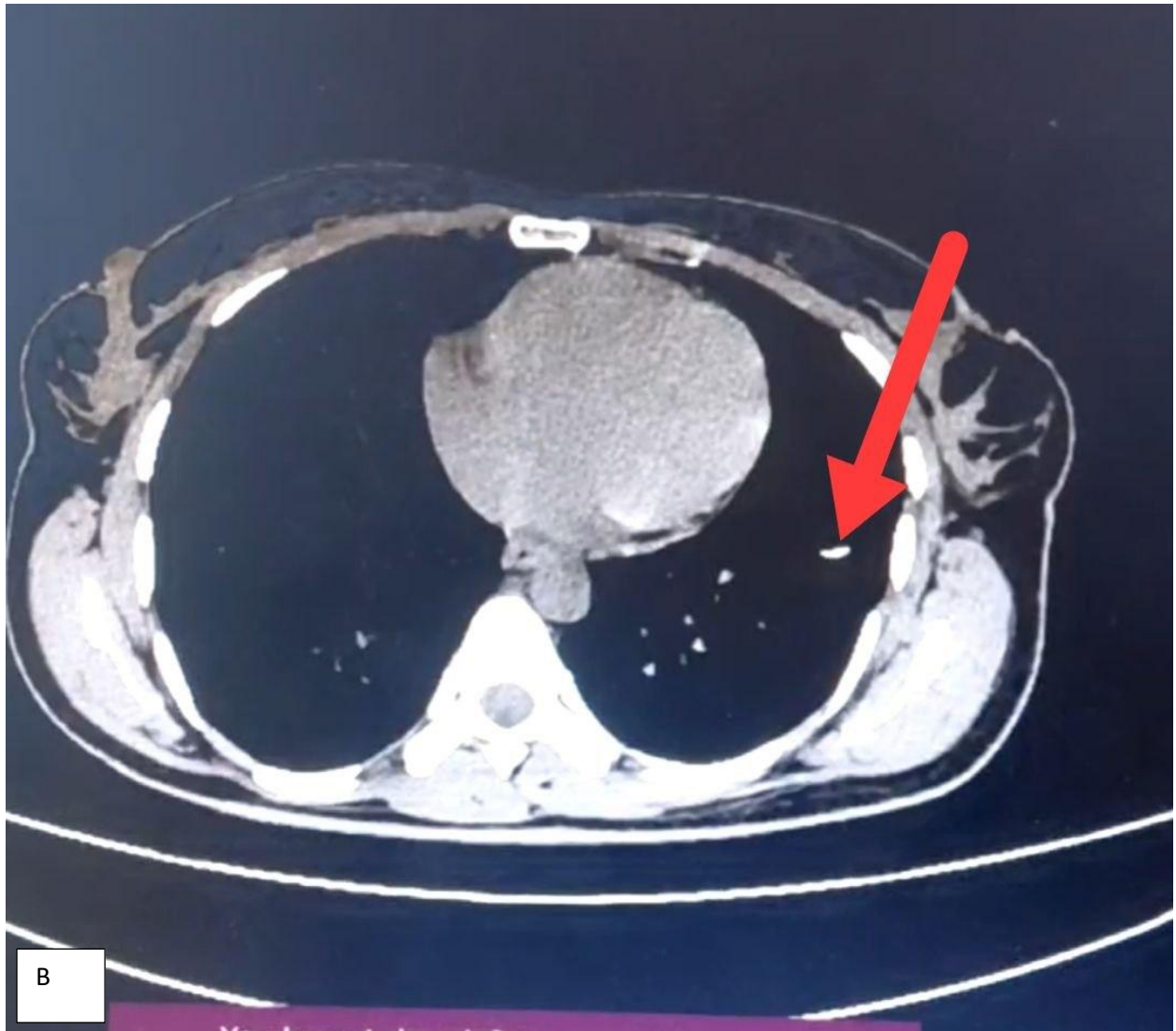


Figure 1. 3D and Axial view CT Scan showing Implanon in left lung (arrows)



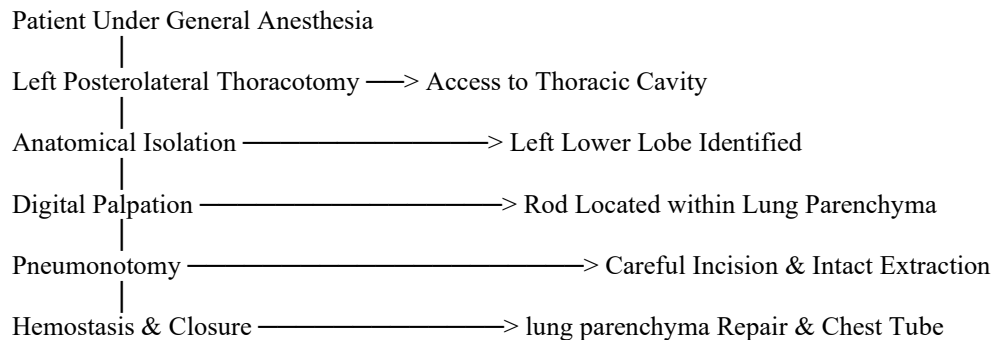
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Vedio 1.Vedio showing implant in coronal section

Treatment

Management options were thoroughly discussed with the patient including open surgery, which in this case can be either simple pneumonotomy and retrieval or segmental resection of the lung, endovascular approach (although impossible in our setup) and watchful waiting. Due to the potential risks of endothelial damage, thrombosis, or long-term pulmonary complications, a multidisciplinary team decided to proceed with surgical removal.

The patient was taken to the operating theater, epidural catheter was inserted, under general anesthesia. A **left thoracotomy** was performed to access the thoracic cavity. The migrated Implanon rod was precisely localized within the left lower lobe. A **pneumonotomy** was carefully executed over the site of the rod, and the intact contraceptive implant was successfully extracted.



The procedure was executed as follows:

- **Anesthesia & Access:** The patient was placed under general anesthesia with double-lumen endotracheal intubation to allow for single-lung ventilation. She was positioned in the right lateral decubitus position. A left posterolateral thoracotomy was performed, and the thoracic cavity was entered via the 5th intercostal space.
- **Localization & Dissection:** The left lung was deflated to facilitate exploration. The left lower lobe was isolated, and careful digital palpation of the lung parenchyma was performed. A distinct, rigid, linear foreign body was successfully palpated deep within the parenchymal architecture of the left lower lobe, corresponding precisely with the preoperative CT findings.
- **Pneumonotomy & Extraction:** Safe isolation of the surrounding segment was achieved. A meticulous incision (pneumonotomy) was performed directly over the palpated rod. Using delicate sharp and blunt dissection, the 4-cm Implanon rod was dissected free from the pulmonary tissue and extracted entirely intact.

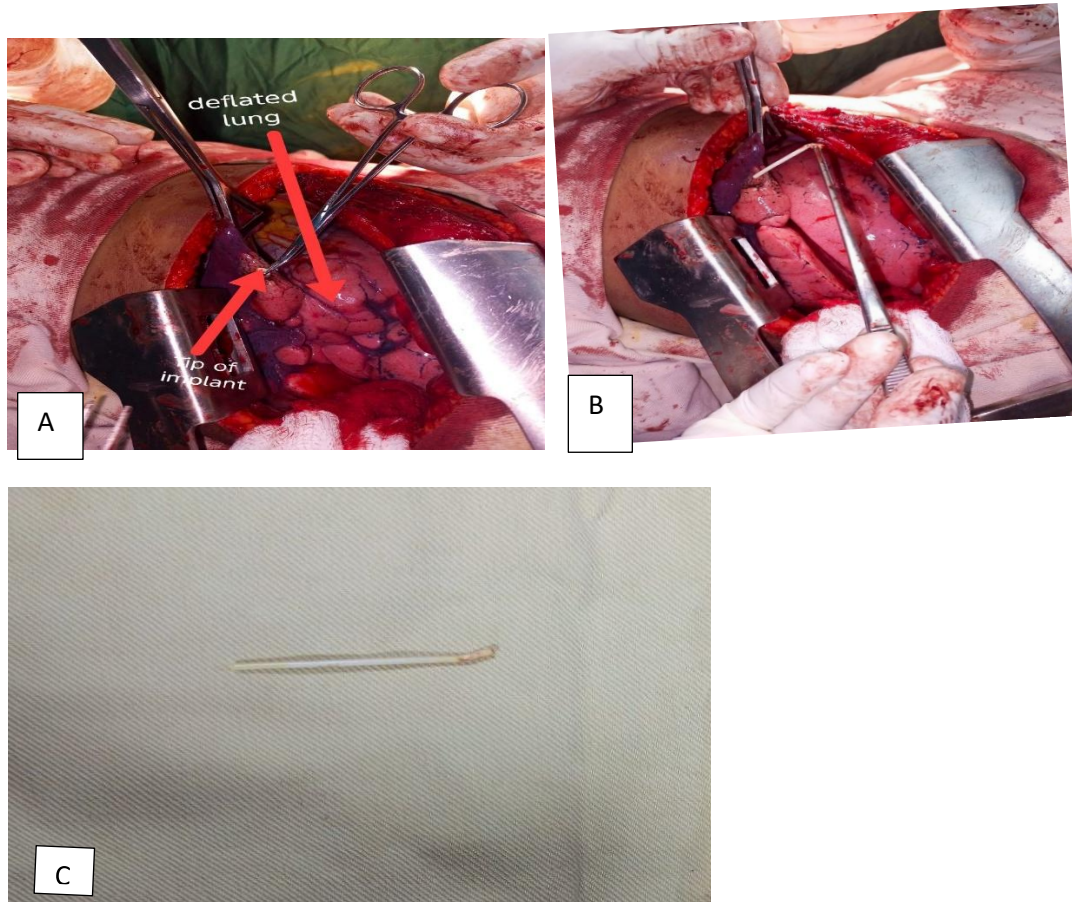


Figure 2. showing (A,B and C) intraoperatively extracted implant

- **Closure:** The pneumotomy site was repaired using prolene, ensuring meticulous hemostasis and pneumostasis. The lung was re-inflated under direct visualization to confirm the absence of air leaks. A single 28-Fr chest tube was positioned in the left pleural space, and the thoracotomy incision was closed in anatomical layers.(Fig.3)

Timeline	Events
3 Years Ago,	Subdermal Implanon insertion in the left arm.
Presentation	Visited primary clinic for removal; implant non-palpable; failed removal trial.
Referral	Referred to tertiary hospital; CT chest localized implant in the left lower lobe.
Intervention	Left thoracotomy and pneumonotomy with successful removal.
Post-Op	Smooth, uneventful recovery and discharge.

Postoperative outcome

The patient's postoperative course was remarkably smooth and uneventful. A post-procedural chest X-ray confirmed complete expansion of the left lung with no residual pneumothorax or pleural effusion. The chest tube was removed on postoperative day 3 following minimal serosanguinous drainage and no air leak. The patient was discharged home in stable clinical condition on postoperative day 5. At her 2-week follow-up appointment, she remained completely asymptomatic with excellent wound healing and normal respiratory function.



Figure 3. Showing stable patient on 3rd Post operative date after chest tube removal

Discussion

Rarity and Clinical Significance

Subdermal contraceptive implants are highly reliable long-acting reversible contraceptives with a clinical failure rate below 1% [2]. While local complications like insertion-site infections or minor bleeding are well-documented, distant intravascular migration is an exceptionally rare event [3]. It is estimated to occur in approximately 1.3 per one million insertions. Interestingly, literature reviews reveal that approximately 73% of all reported migrated implants within the lung vasculature lodge specifically inside the left lower lobe [5]. This striking epidemiological trend perfectly aligns with our findings, as our 27-year-old patient presented with a 4-cm rod precisely localized within the parenchymal architecture of the left lower lobe. While some reported cases feature completely asymptomatic patients diagnosed incidentally [7, 8], our patient presented with mild chest discomfort and failed removal attempt. This presentation is similar to the case described by Patel et al., where an episode of chest pain prompted the initial diagnostic workup [4].

Mechanisms of Migration

The precise mechanism of distant implant migration remains incompletely understood, but several key factors are proposed in the literature. Improper insertion technique—specifically inadvertent deep placement beneath the subcutaneous fascia rather than in the true subdermal plane—is the primary driver of device displacement [1, 3]. If an implant is pushed too deeply, it can directly penetrate muscular structures, or inadvertently enter upper extremity veins like the basilic, brachial, or cephalic veins [1, 3]. Once inside the venous system, the rod travels through the right atrium and ventricle before embolizing into the pulmonary arterial circulation [8]. Other contributing mechanisms include gradual micro-displacement accelerated by routine strenuous upper extremity movements, or a loss of local tissue support following significant post-insertion weight loss [3]. In our case, the patient was a 27-year-old female whose non-palpable implant migrated over a 3-year period. This clinical timeline strongly supports the hypothesized mechanism of immediate or early intravascular entry into an upper limb vein during the initial procedure, followed by subsequent distal embolization and local tissue erosion over time.

Diagnostic and Localization Protocol

When a contraceptive implant is non-palpable, blind surgical exploration must be strictly avoided to prevent severe neurovascular damage and disfiguring scars [3]. Our patient's history underscores this danger, as she presented to our facility with a healing incision from a failed, blind local extraction trial performed at a primary health clinic. Standard literature protocols mandate high-resolution ultrasound as the first-line modality for upper arm localization [3]. If ultrasound and plain films of the extremity fail to locate the device, a chest radiograph is indicated [8]. Because current etonogestrel devices are coated with barium sulfate, they are highly radiopaque and visible on chest X-rays [3, 8]. Computed Tomography (CT) scans of the chest are the definitive tool to confirm the exact location of the implant within the pulmonary vasculature or parenchyma [8]. This diagnostic sequence was successfully mirrored in our report:

following a failed local palpation and extraction attempt, a chest CT scan was utilized to definitively locate the hyperdense, 4-cm rod within the left lower lobe of the lung.

Management and Surgical Selection

Management strategies for intrapulmonary contraceptive implants include watchful waiting, endovascular retrieval, and open thoracic surgery [8]. Watchful waiting or conservative management is typically restricted to asymptomatic patients with hormonally inert devices that have passed their 3-year optimal lifespan [8]. Endovascular loop snare retrieval via femoral vein access is a highly effective, minimally invasive alternative if performed early [7]. However, endovascular retrieval is frequently impossible if the device has migrated for an extended period [8]. Over time, a prolonged latent period between embolization and detection allows the rod to excite a local inflammatory reaction, causing complete endothelialization and rigid fixation within the vascular or parenchymal wall [5]. When endovascular attempts are deemed unfeasible due to delayed detection or significant endothelialization, open surgical removal via thoracic surgery is required [5, 8]. While some published cases required formal segmentectomy due to advanced endothelial encasement [5], or a mini-thoracotomy combined with direct enucleation [6], our team selected a left posterolateral thoracotomy and simple pneumonotomy. Under single-lung ventilation, the migrated rod was isolated by digital palpation deep within the parenchymal architecture. A precise incision directly over the rod allowed the intact contraceptive implant to be successfully extracted with minimal parenchymal trauma. This successful tissue-sparing extraction demonstrates that direct pneumonotomy is an excellent surgical choice over standard lung resections, providing a smooth, uneventful postoperative course and complete restoration of normal respiratory function.

Conclusion

Intrapulmonary migration of subdermal contraceptive implants represents an exceptional clinical scenario that stems from incorrect insertion techniques, deep fascial placement, or inadvertent direct venous entry. When an implant becomes clinically non-palpable, healthcare providers must firmly resist blind local exploration. Instead, standard protocols must be initiated using systematic radiologic imaging—moving from upper extremity ultrasound and radiographs to definitive contrast-enhanced chest CT scanning to confidently confirm or rule out distant embolization. While watchful waiting or endovascular snaring are sometimes utilized depending on device activity or timing, prolonged migration frequently results in vascular endothelialization and tissue fixation that eliminates endovascular options. As demonstrated in this case, open thoracic surgery via a targeted posterolateral thoracotomy and direct parenchymal pneumonotomy serves as a safe, highly definitive, and lung-sparing surgical approach. This strategy successfully removes the migrated foreign body while avoiding destructive lung resections, guaranteeing immediate recovery and an exceptional clinical outcome.

Ethical Statements**Conflict of interest**

No competing interests

Funding

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Patient Consent

Written informed consent was obtained from the patient for any accompanying pictures and publication of the case report

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