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Chirurgiczne postępowanie w krwawieniach do nadnerczy

Surgical Management of Adrenal Hemorraghe

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Abstract

Adrenal hemorrhage (AH) is a rare but potentially life-threatening condition that may occur atraumatically or as a consequence of trauma. Its clinical presentation is nonspecific—most commonly including lumbar or abdominal pain, flank pain, nausea, weakness, hypotension, and, in bilateral cases, adrenal insufficiency.

The diagnosis of AH is often incidental and is not usually the first suspected cause of abdominal pain or hypotension in patients presenting to Emergency Departments. Despite numerous publications, clear therapeutic guidelines are still lacking.

This doctoral dissertation consists of three complementary papers, which include:

- a case report in which adrenal hemorrhage was the first and only manifestation of adrenocortical carcinoma,
- a retrospective analysis of a large cohort of patients with adrenal hemorrhage,
- and a systematic review of the literature on this pathology.

The aim of the entire cycle was to thoroughly analyze clinical cases and expand knowledge on the etiology, diagnosis, and management of adrenal hemorrhage, while also proposing a practical clinical management algorithm.

Publication 1.

Świeczkowski-Feiz S., Kaszczewski P., Gelo R., Krajewska E., Celejewski K., Toutounchi S., Ambroziak U., Pogorzelski R., Gałązka Z. *Huge Hematoma as the First Manifestation of Adrenocortical Carcinoma: A Case Report.* **American Journal of Case Reports**, 2023; 24: e937569. DOI: 10.12659/AJCR.937569.

This paper describes a case of a 38-year-old patient in whom a massive hemorrhage into an adrenal tumor was the first and only manifestation of adrenocortical carcinoma. After initial conservative management and stabilization, he was qualified for expedited right adrenalectomy. Following pharmacologic preparation and full hormonal evaluation, the patient underwent open surgery due to capsule 2upturę. Histopathology confirmed adrenocortical carcinoma.

The case highlights the absence of clear management algorithms and the necessity of relying on the experience of the clinical center. It also underscores

how deceptive adrenal hemorrhage may be in the absence of clinical or biochemical features of adrenocortical carcinoma, requiring oncologic vigilance.

Publication 2.

Świeczkowski-Feiz S., Toutounchi S., Kaszczewski P., Krajewska E., Celejewski K., Gelo R., Pogorzelski R., Gałązka Z. *Characteristics of Adrenal Hemorrhage: A Single Clinic's Experience.* **Polski Przegląd Chirurgiczny**, 2024; 96(4): 36–43. DOI: 10.5604/01.3001.0054.4570.

In this study, we analyzed all patients in whom adrenal hemorrhage was confirmed histopathologically. Among 645 adrenalectomies, 199 showed histopathological features of adrenal hemorrhage, of which 39 were diagnosed preoperatively. We demonstrated that, when AH is diagnosed before surgery, the most common causes include pheochromocytoma (28%,; n = 11), adrenocortical carcinoma (10,26%; n = 4), and adrenal adenomas (23,07%; n = 9). In cases diagnosed postoperatively, the distribution was similar: pheochromocytoma (n = 54), adrenal adenoma (n = 68) and adrenocortical carcinoma (n = 17).

The study shows that 46% of adrenal hemorrhages diagnosed preoperatively are caused by pheochromocytoma, adrenal adenoma, adrenocortical carcinoma, or metastases. We demonstrate the importance of early qualification and adequate preparation for surgical treatment.

Publication 3.

Świeczkowski-Feiz S., Toutounchi S., Krajewska E., Celejewski K., Gelo R., Kaszczewski P., Jakuczun W., Ambroziak U., Gałązka Z. *Adrenal Hemorrhage: Diagnostics, Management, and Treatment. Review and Clinical Update.* **Videosurgery and Other Miniinvasive Techniques**, 2025; 20(3): 255–260. DOI: 10.20452/wiitm.2025.17981.

This review of 41 publications summarizes the current state of knowledge regarding the etiology, diagnosis, and treatment of AH. The authors discuss traumatic and non-traumatic causes of hemorrhage, characteristic imaging features in ultrasound, CT, and MRI, principles of hormonal evaluation, and indications for surgical intervention. Based on both the authors' data and the literature, a clinical management algorithm is proposed:

- in hemodynamically unstable patients or in cases of capsule rupture — open adrenalectomy,
- in stable patients with hemorrhage confined to the adrenal capsule — laparoscopic adrenalectomy, even for tumors larger than 6 cm, provided that the surgical team has extensive experience.