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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/19592
DOI URL: http://dx.doi.org/10.21474/IJAR01/19592

RESEARCH ARTICLE

PANCREATIC INSULINOMA, FROM DIAGNOSIS TO TREATMENT : RETROSPECTIVE STUDY IN THE GENERAL SURGERY DEPARTMENT OF CHU MOHAMMED VI, MARRAKECH

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Manuscript Info

Manuscript History
Received: 30 July 2024
Final Accepted: 31 August 2024
Published: September 2024

Abstract

Insulinomais a rare tumor of the pancreasbelonging to the group of functional neuroendocrine tumors, and isitsmostcommonform. It affects 1 to 4 individuals per 1 million of the general population. Neuroglycopenic manifestations are the most dominant, makingdiagnosisoftenlate, which has benefitedfrom the development of variousmorphologicalmeans of exploration. The management of thesetumorsincludes conservative treatment of hypoglycemiainduced by insulinhypersecretion, non-invasive procedures and surgery, whichremains the cornerstone of radical treatment. Our workis a retrospectivestudybased on a review of the records of patients managed for pancreaticinsulinoma in the generalsurgerydepartment of CHU Mohammed VI in Marrakech, over a period of 06 years (fromJanuary 2017 to December 2022), itaims to shed light on the epidemiological, clinical, paraclinical and therapeuticfeatures of insulinomas.

Introduction:-

Pancreaticinsulinomais a rare tumoraccounting for 1% to 2% of pancreatictumors, but remains the mostcommonpancreatic neuroendocrine tumor, affecting 1 to 4 individuals out of 1 million in the general population (1).It can occur at anyage, with a slightlyhigher incidence in women(2). Althoughbenignin 90% of cases, the functional nature of the condition makesit a serious cause of hypoglycemia, which can be fatal.The diagnosis of pancreaticinsulinomaisoften made late in life, the mostcommon manifestation beingWhipple'striadcharacterized by the presence of hypoglycemicsymptoms, documentedhypoglycemia and resolution of symptomsafter glucose administration (3),confirmation of hyperinsulinismisnecessary for diagnosis, and isbased on fastingserum C-peptide and insulinlevels(4).Preoperativelocalization of the tumor and anymetastasesis essential for curative treatment, and isbased on CT, MRI, PET and echendoscopy(5).Surgeryremains the best means of radical treatment, whilerecentwork has focused on the use of radiofrequency as a promising, but as yetunconsensual, therapeutic option (4).

Material and Method:-

Our workis a retrospectivestudycarried out in the generalsurgerydepartment of the Arrazi Hospital of the CHU Mohammed VI of Marrakech, focusing on the study of records of patients admitted for management of pancreaticinsulinoma over the periodfromJanuary 2017 to December 2022.

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Results:-

Over a period of 6 years, wecollected 7 cases of insulinoma, representing 1.16 cases per year in terms of incidence, a slightfemalepredominancewasobservedwith a M/F sex ratio of 0.75, the meanagewas 42 yearswithextremesrangingfrom 30 to 50 years. 2 of our patients had a history consistent with multiple endocrine neoplasia type 1; the first had a macroprolactinoma and the second end-stage chronicrenalfailuresecondary to primaryhyperparathyroidism.

The diagnosiswas made late, with an averagedelay of 27 months, with an extreme of 60 months in one patient (figure 1).

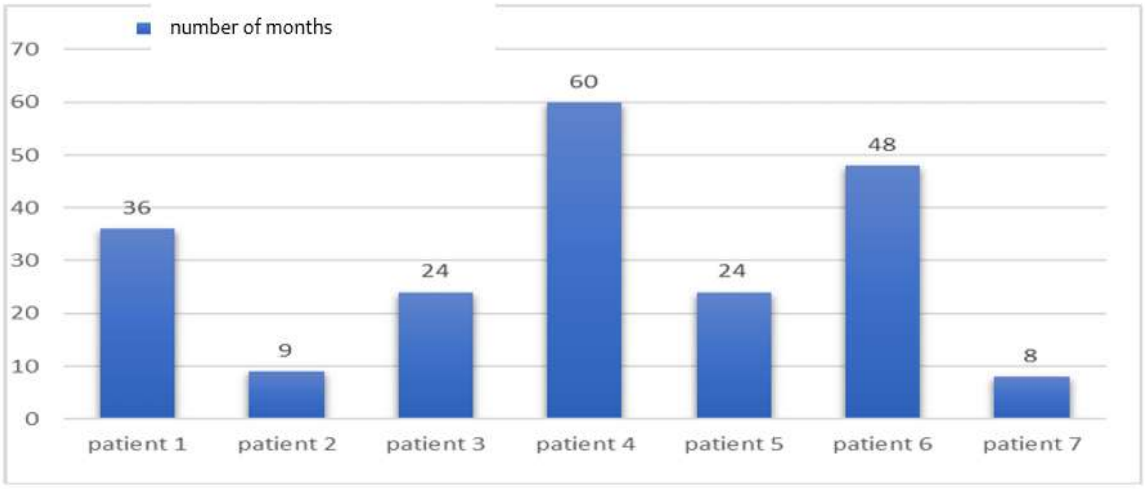

Figure 1:- Time fromonset of symptoms to diagnosis.

Hypoglycemiaassociatedwithneuropsychological manifestations was the common mode of revelation in all our patients, all of whomwere in good general condition at the time of diagnosis.

Biologically, documentedhypoglycemia, elevated C-peptide levels and abnormally high insulinlevelswerepresent in all our patients, reinforcing diagnostic suspicion.

4 patients benefitedfrom an injected abdominal CT scan (figure 2), 2 from an abdominal MRI and 4 from a PET scan (figure 3). In all our patients, the tumorwas unique, with a dominant caudal localizationpresentin 3 patients, isthmicin 2 patients, corporal in 1 patient and cephalicin 1 patient. The insulinomawasrelativelysmall in size, with a median of 15mm.

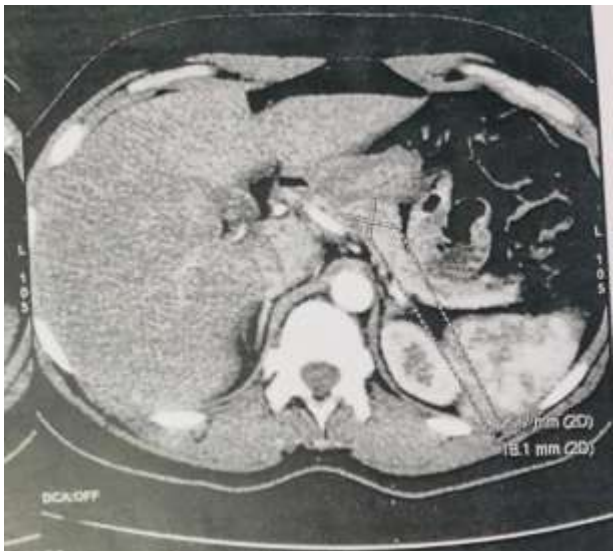

Figure 2:- CT scan showing an isthmicpancreatictumor.

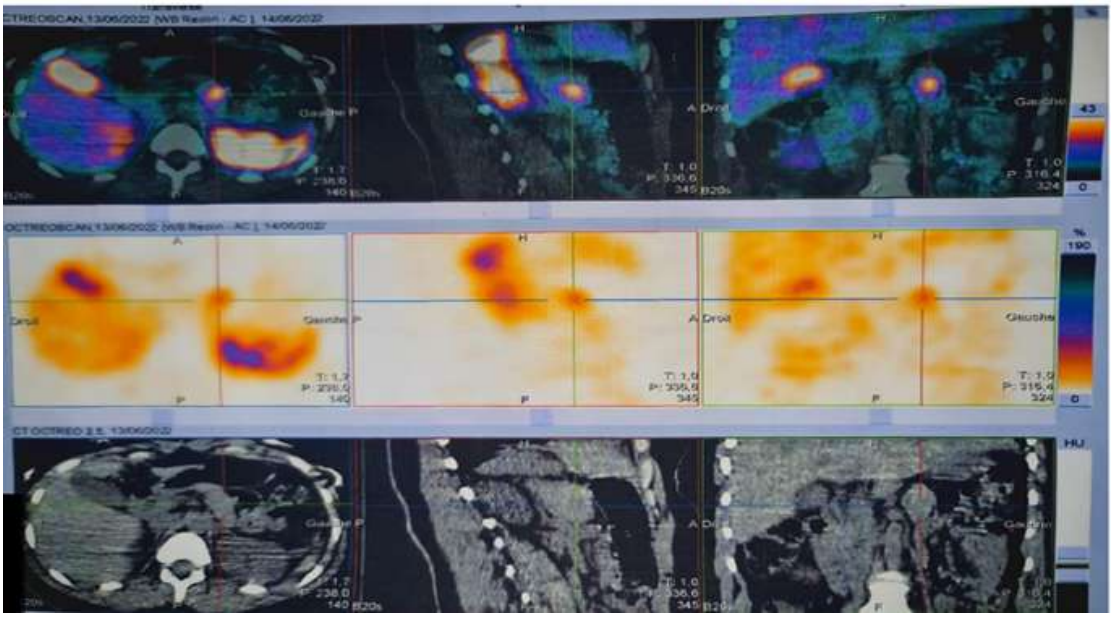

Figure 3:- Nodular hyperfixation of the body of the pancreas.

All our patients underwentsurgery via mediansupraumbilicallaparotomy, withsurgical exploration confirming the imagingfindings (figure 4). Six patients underwentenucleation and one patient underwent caudal pancreatectomywithsplenicpreservation. The averagepostoperativestaywas 6.5 days, and the postoperativemorbidity rate was 71.4%, broken down as follows: 2 cases of pancreatitis, one of whichpresented a pseudocyst of the pancreas, a pancreaticfistula in one patient, surgical site infection in one patient, and pancreaticinsufficiency in one patient.

Pathologically, in 5 patients the tumorwasclassified as well-differentiated NET grade 2 and 2 as grade 1; all tumorshadchromogranin A and synaptophysin expression on immunohistochemistry.

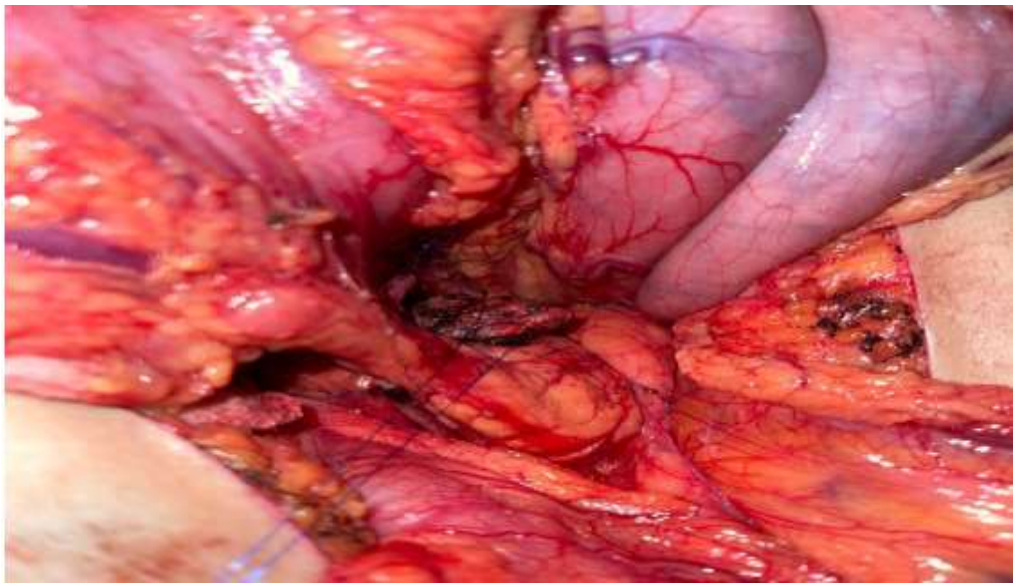

Figure 4:- Intraoperativeview of a pancreaticheadtumour.

Discussion:-

Insulinomais a rare, insulin-secreting neuroendocrine tumorderivedfrompancreaticisletcells(1), more frequent in the fifthdecade and slightly more prevalent in women(6), multiple endocrine neoplasiaisassociated in around 4 to 7% of

cases(7) this percentage was 28.5% in ourseries, the average time fromsymptomonset to diagnosisis 1.5 years(8), but patients can besymptomatic for decadesbeforebeingdiagnosed(9),Insulinoma-inducedhyperinsulinismisclinicallymanifested by blurred vision, palpitations, sweating, chills, agitation and, exceptionally, coma(10) , but the "Whipple triad" or "insulinomatriad" remains the main hallmark of insulinoma,first described by Allen Whipple and Virginia Kneeland Frantz in the 1930s(11), itencompasses: symptomscaused by hypoglycemia; documentedbloodhypoglycemia and resolution of symptomsafter glucose administration.Some patients presentwithneuropsychologicalproblemsthat are more marked on an emptystomach and oftenaggravated by physicalactivity, leading to misdiagnosis(8).Clinical suspicion requiresbiological confirmation based on 24-hour fastingserum glucose, insulin and C-peptide levels, which are found to beabnormally high (8). As soon as the diagnosisis made, itis essential to localize the tumor, and check for the existence of metastases,30% of tumours are smallerthan 1cm and insulinomas are multilocularin 10% of cases (12) ,whichmakes the task more difficult. Precisepreoperative location helps to reduce the conversion rate in the case of laparoscopic management (1) ;Abdominal ultrasound, CT scan, magneticresonanceimaging and echo-endoscopy are all used to locatetumourspreoperatively; abdominal CT isconsidered the first-line radiologicaldiagnosis(13) , with a sensitivity of 72%(14) ;Abdominal MRI is a safer, non-irradiating technique with a sensitivity of 75%(15). Insulinomaappears as a lesionwith T1 hyposignal and T2 hypersignal.Echoendoscopyisusedwhen CT and MRI are unsuccessful, and has a sensitivity of between 70% and 95% (16). The combination of fine-needle aspiration furtherincreasessensitivity to 94% and specificity to 95% for lesion identification.The sensitivity of radiologicaldiagnosisreaches 100% with the combination of abdominal CT, MRI and echo-endoscopy(17). Intraoperativelocalizationisperformed by manual exploration, and intraoperativeultrasound can beveryuseful.

The treatment of choice for pancreaticinsulinomaislaparoscopicresection(1), but open resectionremains the preferred option. Enucleationisindicated for small (< 2.5cm), benign, single, superficiallesionslocated at least 2 to 3 mm from the Wirsung duct(18).Large tumourswith a strong suspicion of malignancyor the presence of metastasesindicate recourse to pancreatectomyinstead of enucleation(19), all types of pancreatectomy are possible, cephalicduodenopancreatomy, central or caudal pancreatectomy, splenic or pyloricresectionis not obligatory and depends on the operativefindings(14) and lymphnode curage is not routine.

Roboticresection shows promise as an alternative to conventionalresection, but requiresstandardization of technique (20).

For non-operable patients, glycemic control measuressuch as diazoxide, calcium channelblockers and glucocorticoids are undertaken, while octreotide isbeneficial for unresectablemalignanttumors (21).

Echoendoscopy-guidedradiofrequencywasintroduced for pancreatictumorpathology in pigsin 1999(22), and sincethen has been used more frequently in certain humantumor pathologies, althoughthis has not been clearlyestablished(4). It mayoffer an alternative for patients who are unable to undergopancreaticresection (23).

Pancreaticfistularemains the mostfrequent post-operative complication, irrespective of the laparoscopic or open approach (14).

Conclusions:-

In conclusion, insulinomaremains a rare but significant neuroendocrine tumor of the pancreas. Advances in ourunderstanding of thistumor, as well as in imaging techniques and treatment options, have improved the management of insulinoma patients.

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